Her Majesty Queen Elizabeth II

HISTORY

OF THE

CORPS OF ROYAL ENGINEERS

VOLUME XI
1960 TO 1980

THE YEARS OF CONTRACTION - WITHDRAWAL, REDUCTION AND REORGANIZATION

ACTIVITIES OF THE CORPS OF ROYAL ENGINEERS IN FULFILLING THEIR COMMITMENTS TO NATO AND TO THE ROYAL AIR FORCE, CONTINUING TO PROVIDE SUPPORT TO OUR FORCES DEPLOYED IN THE FAR AND MIDDLE EAST AND TO THE STRATEGIC RESERVE AT HOME, AND PARTICIPATING IN A LONG CAMPAIGN IN NORTHERN IRELAND, WHILE STILL SEIZING OPPORTUNITIES WHENEVER POSSIBLE TO TAKE PART IN A WIDE SPECTRUM OF MINOR OPERATIONS, PROJECTS AND EXERCISES THE WORLD OVER; AGAINST A POLITICAL BACKGROUND OF SHRINKING NATIONAL INFLUENCE, REDUCING ARMED FORCES STRENGTH AND FREQUENT REORGANIZATION.

EDITOR

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FOREWORD

Although it is only six years since Volume X was produced I much welcome the publication of this new volume of our Corps' history. Covering the years 1960 to 1980 it chronicles the final handing over of power in the former British Empire almost in its entirety and the part played by Sappers in the many emergencies, counter-insurgency operations and works for peace that resulted. It also records the Corps' contribution to the winning of the Cold War as part of NATO, and particularly BAOR; although we will have to wait for Volume XII for the final collapse of the Warsaw Pact.

Thus Volume XI effectively marks the end of the post-war period with Britain readjusting from its world-wide responsibilities to a new role as a member of an alliance against the background of Superpower confrontation and the threat of Global War. As well as being an invaluable book of reference by recording the facts of history, it aims to convey the flavour of so-called peacetime soldiering in a changing social order, frequently hectic, often dangerous, invariably challenging and demanding of ever more professionalism, but nevertheless offering, for those prepared to look for them, opportunities for enormous fun.

GENERAL SIR GEORGE COOPER
GCB MC DL
CHIEF ROYAL ENGINEER

December 1992

PREFACE

One of the outcomes of the financial restrictions imposed on Defence Expenditure over recent years has been a general reduction in headquarters' staffs and the consequent destruction of many papers whose retention was not deemed essential. Inevitably much material that is only of historical value tends to fall into this category and all too soon is irretrievably lost.

Largely for this reason as early as 1978, before Volume Ten of the History of the Corps of Royal Engineers had been finally completed, the Royal Engineer Publications and Library Committee decided that a start should be made on the assembly of material for Volume Eleven to cover the twenty year period immediately following it, while such material was relatively easily accessible. In October 1985 a small Working Party consisting of Brigadier W J Reed (who sadly died before the work was completed), Lieut Colonel J N Cormack MBE MC and myself, under the Chairmanship of Colonel G W A Napier was set up on behalf of the Institution to oversee the work. In 1990 I was appointed Project Officer to prepare this volume for publication.

A commonly recurring theme for an observer of history is the cyclic nature of events; no sooner does the momentum of change seem steady than it either accelerates wildly or slows and all too soon moves gently into reverse. The twenty years under review in this volume were no exception. No sooner had elaborate preparations got under way for new camps and barracks to be built across the world to protect Britain's interests in each theatre than the wind of change blew away the plans and the army's role was redefined to provide a quick response intervention force based in the United Kingdom; subsequently even this responsibility became submerged beneath a preoccupation with domestic and European defence. The civilian population too were undergoing dramatic changes in their aspirations; no sooner had the public at large come to appreciate their mounting affluence in the "swinging sixties" than cuts, unemployment, pay freezes and inflation were ushering in the "sombre seventies". As a result, the period between 1960 and 1980 is a fascinating though at times depressing one, covering as it does an era of major transformation in the affairs of the United Kingdom. In order to set the scene I have therefore tried in the opening chapter, before recounting the work of the Royal Engineers in detail, to

provide a national backcloth showing the changes in defence policy and the social climate over this period and how they affected the Army.

The rise and fall of the Strategic Reserve concept during this period has made the division of the chapters into separate geographical areas less easy than usual, but I have tried in general to adhere to this format. I have had the inevitable problems in trying to decide what should or should not be included and have attempted to ensure that major events have not gone unrecorded. Any work if it is to be of value for reference purposes is bound to contain a great deal of indigestible information, but I hope to have leavened such facts with sufficient marginal detail to enable the future reader in the years to come to savour traces of the flavour of life at the time.

I believe it should be possible for the same reader to be able to make use of this volume without having to refer to others in the series and in the interests of completeness some descriptive passages do therefore repeat a little of what has been said before.

I am indebted for much of the material contained in this book to articles in the Royal Engineers Journal, whose authors regrettably are too numerous to be mentioned individually. However I would like to thank most warmly the following officers who have been responsible for the drafting of major portions of the text:

Lieut Colonel T R Burrows, Brigadier H W Baldwin OBE, Brigadier D L G Begbie OBE MC, Major General F W E Fursdon CB MBE, Brigadier J R E Hamilton-Baillie MC, Captain J W R Hammond, Major A S Hogben QGM, Colonel J H Joiner, Major General L E C M Perowne CB CBE, Brigadier W J Reed, Major General P C Shapland CB MBE, Brigadier J B Wilks CBE, Colonel I T C Wilson MBE MC.

I am also very grateful to the large number of individuals who have supplied me with anecdotes and background information; for the help given by Miss J M Seaman of the Technical Information Centre RE, the staffs of the Corps library, Chatham and the Prince Consort's library, Aldershot; to Lieut Colonel J N Cormack MBE MC, Editor Publications Section and the Typing Pool RSME who prepared the text; the staff of Military Survey

(RE) Ministry of Defence who carried out the detailed preparation and production of maps, and my typist Mrs S Harrington.

While every effort has been made to verify points of detail by drawing on official sources, even these documents do sometimes contain conflicting or incomplete statements. I have therefore based the data, particularly that contained in the Annexes, Figures and Tables, on the best available to me, conscious that this may sometimes contain inaccuracies or omissions.

Nevertheless, I hope that this latest volume of the history of my Corps will serve its rightful purpose; namely to help future generations gain inspiration from the many deeds of which their predecessors can be justly proud while at the same time learning for themselves some lessons from the past.

H W B Mackintosh

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CHAPTER I

BACKCLOTH

THE CHANGING BACKGROUND IN FOREIGN AND DEFENCE POLICIES AND THE SOCIAL CLIMATE AS IT AFFECTED THE BRITISH ARMY BETWEEN 1960 AND 1980

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INTRODUCTION

National Defence Policy

Over the millenia the story of warfare can be characterized as a continuous arms race while actual and potential antagonists invented weapons of ever greater power and effect only to face subsequent defeat by their successors. In the first World War the machine gun defeated massed infantry only to be dominated in turn by the tank. Only thirty years after Cambrai the atomic bomb brought World War Two to an abrupt end and its derivatives were to dominate the political and strategic scene, not only in Europe but over much of the world, for the rest of the century.

Throughout the first post-war decade, as the previous volume of Corps History reminds us, the defence policy of the United Kingdom relied heavily upon the maintenance of a strong military presence abroad to protect Britain's interests. By the end of the 1950s, however, many factors, including a general recognition of her diminishing role in world affairs and concern over the rapidly escalating costs of all forms of defence, had given rise to a general shift away from this policy. The turning point was marked by the Defence White Paper of 1957, which announced the final abandonment of any attempt to maintain large conventional forces worldwide. Instead, the nuclear deterrent was to be the cornerstone upon which international defence was to be based and by which crises between the major

powers were to be resolved. For lesser conflicts a conventional force would be held as a strategic reserve in the United Kingdom, ready to be flown quickly to areas of trouble.

Dominating the role of the Army over the 20 year period 1960 to 1980 were three elements. First, the reduction in size of the Armed Forces, due to the ending of National Service and a succession of defence cuts, leading to inevitable reorganizations, redundancies, amalgamations and cutbacks in equipment programmes. Second, our total withdrawal from huge bases in the Near, Middle and Far East where we had been established for many years (and through several wars), and our resulting increased concern for European matters and our contribution to NATO. Finally, a commitment to an operational role of a particularly unpleasant nature in Northern Ireland which escalated rapidly in the early 1970s and remained at a significantly high level thereafter. The implications of each of these elements on the Royal Engineers are examined in detail in later chapters of this volume. Notwithstanding the reductions in overall strength of the Services, a large number of relatively small commitments were undertaken worldwide, particularly by the Royal Engineers, on political or humanitarian grounds or simply because they were good training, and these are recounted as well.

Manpower

The decision to end National Service was made in the late 1950s when the long term total regular manpower requirement for all three Services was expected to be 420,000, of which the Army element was to be about half. This led in 1957 to amalgamations, the grouping of infantry battalions into large regiments and brigades and a reduction in the Royal Engineer order of battle by the equivalent of five regiments. In 1967, however, the Government announced its intention to cut manpower from the 417,000 it had currently reached to 380,000 in 1971 with a target of 340,000 to be reached by the mid 1970s of which the Army would have some 170,000. The following year these figures were further reduced, plans were made for a BAOR brigade to be redeployed to UK to save money, the withdrawal from the Far East was to be accelerated and all Civil Defence units were to be disbanded except for the Royal Observer Corps and Women's Royal Voluntary Service.

Further cuts were announced in 1975 when the Army's share of manpower was reduced by 15,000 and a Restructure Plan was devised to lessen the diminution in effectiveness such reductions would otherwise have. It was also general policy to replace uniformed manpower by civilians whenever possible. Thus whereas the proportion of soldiers to War Department employees was 7:5 in 1957, by the time of the formation of the Ministry of Defence in 1964 there were equal numbers of both. With the continued rundown in Service strengths there were nearly two civilians to every soldier in 1978.

Finance

In parallel with the restrictions placed on manpower, severe financial limits were imposed by the Government. The original total Defence Budget for 1977/78 for example was £5,600 million, but in July 1976 this was reduced by £100 million and by a further £100 million in December and the Army had to take its share of these cuts. Likewise, in December 1976 the 1978/79 Defence Budget was reduced by £230 million, representing some five per cent of the whole.

The NATO Commitment

It can only be a matter of profound relief that throughout the post war period with which we are concerned NATO forces were never actually deployed on the ferocious operations for which they studied, trained and rehearsed continuously for so many years. Nevertheless, history will show that their endeavours were not in vain and the deterrent policy of which the ground forces were a major part did indeed "keep the peace".

Early in this period the USSR, unable to visualize any antidote to the nuclear weapon realised that her security depended upon developing an armoury of similar devices commensurate with NATO's and by 1960 this she had effectively achieved. While NATO perceived the threat as an ideological communist expansion spearheaded by a massive Soviet armoured thrust across Western Europe, the Warsaw Pact countries felt themselves threatened by a nuclear encirclement by American warheads. Having reached a nuclear stalemate, and thus a mutual deterrence, a political game of bluff was then played out between NATO and the Warsaw Pact for the twenty years covered by this volume. A key factor in this successful deterrent theory which kept the peace in Europe throughout this period

was that the strength of the NATO forces needed to be sufficient to make any potential aggressor believe that an attack by him might not succeed, while at the same time leaving him uncertain as to whether or not nuclear weapons would be used against him. The ground force element of this deterrent thus remained at a consistently high level throughout. The British Army contribution, for example, was a regular Corps of at least three divisions with full supporting echelons and a battalion group for deployment on the NATO flanks, backed up by many units of the reserve army.

Maintaining adequate forces for these purposes became increasingly expensive and as a generation grew up who had not known war in Europe they began to question both the level of military expense and the need for continued national military service. Great Britain was the only NATO nation at the time relying upon an all regular army. But while the NATO nations made every attempt to find ways of reducing their defence burden the USSR continued to expand her ground forces capability remorselessly. Between 1968 and 1978 Soviet main battle tank numbers, for instance, increased by 24 per cent to nearly 10,000 and her armoured personnel carriers by 83 per cent to a similar figure, while her defence spending had risen to 12 per cent of the gross national product or three times that of most NATO nations. Russian investment in high technology also led to the introduction into service of equipment equal to and in some cases superior to that produced in the West. She also made it quite clear she would not hesitate to use chemical weapons if she believed it was in her interest to do so.

At the international level this twenty year period saw the relationship between the USA and USSR, who were the dominant powers in NATO and the Warsaw Pact, fluctuate between provocation and semblances of trust and friendship. In 1961 the Soviets built the Berlin Wall. The following year the USA started to deploy intermediate range missiles into Europe and Krushchev retaliated by sending Soviet nuclear missiles to Cuba. This crisis was resolved with the withdrawal of both and led to a period of better relationships between the USA and USSR leading to the installation of a "Hot Line" between Washington and Moscow and a treaty banning nuclear tests in the atmosphere, in space and underwater.

In 1968 as a result of a Ministerial Meeting in Reykjavik the USSR was invited to study a proposition for Mutual and

Balanced Force Reductions (MBFR), but soon afterwards detente received a serious setback when Warsaw Pact forces invaded Czechoslovakia on August 20. However, the following year saw the birth of an era of negotiation rather than confrontation with the USSR, and the Strategic Arms Limitations talks began in November 1969, followed in 1971 by exploratory talks on MBFR.

Undoubtedly, the standard of training and readiness varied between the national contingents, but throughout the NATO armies some of the impact of these political negotiations could be felt at unit level as the emphasis in training swung between the dispersion necessary to counter the nuclear threat to the concentration essential for conventional operations. Similarly, the need for protection against chemical attack appeared to wax and wane as the political temperature rose and fell.

The cohesion of the NATO Alliance was considerably shaken by events in the Eastern Mediterranean in 1974 when a coup d'état in Cyprus was followed by a landing of Turkish troops on the island, as a result of which relations between the two members Greece and Turkey were severely strained. Thereafter an increasing awareness of the need to improve NATO's conventional defences was largely responsible for the decision taken in 1977 by the member states to increase their expenditure on defence by three per cent per year in real terms.

Operations outside Europe

Because of the potential instability of many emerging Governments, the policy of general reduction in overseas garrisons could not be implemented precipitately. When this did happen, as when the Belgians suddenly withdrew from the Congo, chaos ensued and the United Nations had to fill the vacuum. This particular case was also an example of a new phenomenon, that in certain countries British forces were going to be unacceptable politically as peacekeepers. Nevertheless, the Army still found itself actively engaged in operations somewhere in the world throughout the 1960s and early 1970s. Major campaigns were waged in the Far East (confrontation against Indonesia from 1963-66 which at its peak in 1965 required the deployment of 60,000 troops) and in Aden and the Protectorate against guerillas and terrorists from 1964-67. Less protracted operations included a rapid deployment to Kuwait in July 1961 to support the Emir against a possible Iraqi threat and a

multitude of swift short term intervention operations to maintain law and order such as those in the Cameroons in 1960 at the time of independence, in Cyprus in 1963 prior to the establishment of a United Nations force, in Kowloon and Hong Kong during riots in 1966 and 1967 and in Anguilla in 1969.

In varying degrees many of the operations were directly related to the internal upheavals undergone by territories achieving independence from colonial rule, of which there was an ever-increasing number throughout this period; Cyprus and Nigeria in 1960, North Cameroons, Sierra Leone and Tanganyika in 1961, Jamaica and Uganda in 1962, Kenya and Zanzibar in 1963, Guyana in 1966. Meanwhile, in line with our policy of withdrawal from bases overseas, evacuation to the UK continued; Libya in 1969, the Gulf in 1971, Malta in 1979; sometimes in peace and sadness as from Singapore in 1975, sometimes in violence and bitterness as from Aden in 1967. By the end of the 1970s the only British presence outside Europe was confined to garrisons in Gibraltar, Cyprus, Hong Kong and Belize, a Gurkha battalion in Brunei and some Royal Marines in the Falkland Islands.

These operations were not conducted without their toll of lives. About 200 Army all ranks were killed or wounded in Borneo, about the same number in Cyprus, three times this figure in Aden and the toll in Northern Ireland had reached 442 Regular Army and the UDR killed by the end of 1980. The only year since the war in which no British soldier was killed on active service somewhere in the world was 1968.

The Army was also required to render emergency assistance to countries in times of disaster - floods as in Kenya, Pakistan and the Far East, earthquakes as in Skopje and El Salvador, and hurricanes as in Hong Kong and British Honduras; and, as if all this was not enough, it could always be called upon to keep essential supplies or services moving in times of industrial unrest at home, be it firefighting, petrol deliveries or the provision of public utilities.

SOCIAL CLIMATE

The Affluent Society

By the early 1960s there were few observable legacies left from the Second World War for the people in UK. Wages had risen, though unemployment remained about two per cent, and individual real wealth was genuinely greater. More money was

available to the general public for the purchase of consumer goods and for expenditure on leisure such as holidays abroad. As Harold Macmillan said in an election speech at Bedford in July 1957 people had "never had it so good". Sports such as sailing and golf, hitherto the preserve of the wealthy, were now much more widely available. Housing was better; by 1958 ten million people in the United Kingdom lived in post-war property. The population as a whole was better fed and healthier, and more aware of the world outside their own immediate environment. The nature of the population itself was changing as the number of immigrants, attracted by the boom, rose steadily from 20,000 in 1959 to 58,000 in 1960 and reached 136,000 in 1961.

The growth in bureaucracy and monopoly in business was beginning to lead to a build-up of internal pressures, bringing demands for a share in decision making from the shop floor and participation in management affairs from working level, and widespread expression of organized protest in the form of marches, sit-ins and strikes. Women's calls for rights of equal opportunity became more vocal, and more wives went out to work; by the end of the 1960s over half the married population was doing so, and one-sixth of the country's labour force was female.

Greater affluence brought greater independence from their parents for the young, and the limelight was much focused on the teenager. Encouraged to "do their own thing" and flout convention, youthful cults arose with startling speed and a wide variety of manifestations. Some were relatively shortlived; Skinheads, Mods and Rockers, skifflegroups and hippies; some had a longer influence; miniskirts, the Beatles, experimentation with drugs. Relaxation in conventions coupled with more leisure time generated a permissive society in which hooliganism, illegitimacy, vandalism and crime flourished, particularly among adolescents. Paradoxically, the young also shared increasing concern for the old, the deprived, the homeless and the hungry, especially abroad.

Effects on Service Life

These social and cultural changes had an inevitable effect on the life and habits of the Armed Services, particularly on those at regimental duty. Experience of the last conventional war was rapidly becoming a scarce commodity; by 1963 officers were

joining their Regiments who had not even been born in 1944. So combat experience was confined, with the exception of Korea, to internal security and counter-terrorist operations. The reduction in overseas bases brought greater stability but more separation to dependants, because it became more usual for units to serve abroad on nine-month unaccompanied tours. As a result, however, families tended to become much more rooted in UK and many service wives went out to work.

By the early 1960s, barrack life had changed considerably, and was more in keeping with the modern way of life. Improvements to buildings gave more room and privacy and the soldier no longer had to spring out of bed when reveille sounded, but was required only to be on parade properly dressed at the appointed time and place. Wherever practicable units worked a five day week, and it was no longer necessary for a soldier to have to book in and out of the guardroom. His increased leisure was spent in a wider range of sports such as canoeing, cycling and free fall parachuting, and adventure training was encouraged to develop determination and self confidence. The standard of cookhouse catering greatly improved with a wider variety of menu, and the soldier no longer had to carry his own mug, knife, fork and spoon to meals. By the middle of this period too, commanding officers had access to small funds for use at their own discretion on their unit's amenities.

Recruiting and Pay

With the increasing well-being offered in civilian careers, an all-regular Army had more competition to face in seeking recruits than ever before. At the same time its attraction had been appreciably diminished by reductions and withdrawals from distant stations so that there was less opportunity for adventure, travel and sport. There was also some support for the old theory that none but never-do-wells join a country's regular forces in peacetime. Mothers and fiancées, between them probably the most influential voices at home, were apt to discourage their men from going abroad, and enlistment seemed to many wives to be a threat to the stability of the home, as married quarters were generally in short supply. In addition, relatives or friends who had not actively enjoyed their National Service but took delight in regaling their listeners with tales of privation, were a frequent source of dissuasion. There was also a certain

confusion in some minds about the purpose of the Services in peacetime; this stemmed from the decision to base defence strategy on a willingness to resort ultimately to nuclear weapons, which therefore led to speculation that there was little need for conventional forces in a modern "push-button" war.

By 1970 the fall in birthrate in the middle of the 1950s caused a noticeable decline in the number of young men available to join the armed forces, exacerbated too by the raising of the school leaving age in 1972 and the longer time spent by young men in full time education. This was reflected as was to be expected in the recruiting figures. On 1 April 1970 there were only 373,000 UK personnel in the forces as against a planned 391,000. The cause of this decline was a serious drop in recruitment of both officers and men reflecting uncertainty and loss of confidence regarding the Services' future. The drop in recruitment was even more disturbing than the shortfall in overall numbers because it unbalanced the forces - shortages were most severe in the junior ranks - as well as weakening them.

Determined efforts reversed this trend in 1971; not the least of which was a re-examination of pay and allowances which led to a completely restructured Military Salary in April of that year, and the setting up of an Armed Services Pay Review Body to keep a watching brief on Service Pay. This worked well at first, but even so by 1975 military pay had ceased to be comparable with that of civilians and was constrained by the Government Pay Policy restrictions; furthermore there was no way round this policy for the soldier by, for instance, negotiating productivity agreements or working overtime. Discontent became quite widespread by 1977, aggravated by the firemen's industrial dispute during which some servicemen found themselves alongside strikers already earning far more than they were, and there was even open discussion of the merits of a soldiers' trade union. By 1980, however, full comparability was restored, and recruiting and wastage rates returned to normal figures.

ARMY CAREERS

Officers

In 1960 the Army Council authorized the introduction of a "Careers to 55" scheme for officers. Previously, officers not promoted to major were retired compulsorily at about the age of 34 and did not qualify for retired pay. Officers above major were

normally retired at ages ranging between 47 and 52 but with a rate of retired pay not dependent upon their length of service. Under the new scheme, promotion to major by selection, normally between the ages of 34 and 36, was introduced. Those captains who were not selected were allowed to serve until they were about 37 and had thereby 16 years reckonable service for retired pay.

Later in the 1960s a review of the officer career structure resulted in a scheme for widening the age zone in which promotion to lieutenant-colonel could be achieved in order, on the one hand, to ensure that outstanding officers destined for the highest ranks could obtain the necessary experience in command and on the staff early enough in their careers; and, on the other hand, to ensure that experience received its due recognition. The age bracket for promotion to lieutenant-colonel was set at 37 to 47 and the first early promotions were made in 1967 in what became known as the "Pink List".

Promotion to colonel and brigadier was similarly regulated by age brackets except that early promotion to brigadier was only available to those who had earned a one-star command recommendation whilst commanding as lieutenant-colonels.

At the same time as this system was being established, defence reviews led to the need for reductions in the manpower ceilings and a process evolved whereby the career structure was made to balance by offering redundancy to officers (and soldiers) in certain age groups in the mid-career ranks. Initially the generous terms offered (dubbed "the golden bowler") encouraged sufficient volunteers to leave and even in later redundancies no officer in the Corps was made compulsorily redundant despite less favourable terms.

Soldiers

Throughout the 1960s, the normal engagement (which had been introduced in May 1952) was for a period of 22 years. Initially soldiers had the right to opt out at the end of three years or after any multiple of three years, and from 1957 those enlisting for a longer period received a higher rate of pay. There was no definite age for retirement of soldiers but as the upper age limit for engagement was normally 25, those serving for a full term usually retired at between 40 and 47 years of age.

On 1 May 1972, the 22 year engagement was replaced by the Notice Engagement, under which Colour service could be

terminated at any time after the end of three years service, provided 18 months notice to do so had been given. To encourage commitment to a long engagement, committal pay was added to the daily rate of pay of soldiers committed to six years service, with a higher rate for commitment to nine years service. Thereafter some redundancies were necessary to adjust the soldier rank structure to revised manpower ceilings. These were treated in the same way as the officer redundancies but were proportionately fewer.

All soldiers had a statutory right to claim discharge by purchase between their enlistment date and the end of their first three months service. Thereafter they could only apply for premature voluntary release (PVR) on payment, subject to certain conditions - for example it was not normally allowed if they had been warned for service overseas or had been selected for specialist training.

To be eligible for consideration for promotion, a soldier had to be recommended for the next higher rank and also be qualified for promotion. Appointment to lance corporal and corporal was normally made by the commanding officer with the agreement of the Officer-in-Charge of RE Manning and Records Office (REMRO). Promotion boards assessed the merit of corporals and above on the basis of confidential reports submitted by commanding officers every year. The qualifications necessary for promotion included laid-down standards in education, employment experience, medical fitness and trade skill, and in some cases, age.

REORGANIZATIONS

Reserve Army

In 1960, while National Service continued, some 60 per cent of the established strength of the Territorial Army was filled by soldiers serving their four year liability to the Reserve Army on completion of their whole time service. Now that the end of National Service was in sight, the time was ripe for review. On 20 July 1960 it was announced in Parliament that the Territorial Army would be reorganized, primarily to take account of the end of National Service. Its roles were redefined to be the provision of: first, reinforcements for the Regular Army, particularly in BAOR; second, headquarters and units to aid the Civil Power in

the United Kingdom; and third, a framework on which general preparations for war could be built up.

Under this reorganization the Territorial Army continued to be organized on a divisional basis, but in order to achieve the closest possible relationship with the Regular Army and the Civil Defence Organization, the ten divisional headquarters were amalgamated with the Regular Army District Headquarters which generally matched Civil Defence Regions. The plans were implemented on 1 May 1961 and the immediate effect as far as the Corps was concerned was beneficial, as two new regiments and several squadrons were formed, largely from re-badged and amalgamated Royal Artillery batteries, and searchlights also returned to the Corps after their twenty year sojourn with the Gunners with the formation of two movement light squadrons.

The Army Emergency Reserve was also reorganized in 1961 into three categories:

Category I	Units and individuals willing to be called out for Service with the Regular Army on the authority of the Secretary of State for War before a Royal Proclamation was issued.
Category II	Units, mainly administrative, which could not be raised in the Territorial Army but were required on General Mobilization.
Category III	A small number of highly skilled technicians required on General Mobilization.

As the reorganization proceeded it was also decided to raise a new volunteer category, the Territorial Army Emergency Reserve, to serve with the Regular Army in times of tension, who could be called out for up to six months without the need for a general proclamation. They were formed in 1962 and became known as the "Ever Readies".

These new organizations were not to last. A study was conducted to make recommendations as to the size and shape of the Reserve Army needed to support the reduced and

foreseeable commitments of the Regular Army in the context of a short war in Europe, started with little warning. Major changes in policy stemmed from this study. In 1967, the Territorial Army and Army Emergency Reserve were replaced by the Territorial and Army Volunteer Reserve (TAVR) and the Ever Readies by the Special Army Volunteer Reserve (SAVR). Two years later, further reductions were made by disbanding the Home and Civil Defence element of the TAVR (TAVR III) and confining the main role of the remainder to reinforcing the regular formations and units of BAOR. The responsibility for providing a framework for the expansion of the Army was handed over to cadres, each of eight all ranks. The new policy was based on the concept of a short war stopping short of a nuclear holocaust, fought in the main by formations and units already in being in peacetime. The famous Territorial Army divisions, proud of their record, of their regional associations and of their celebrated and familiar divisional emblems, divisions that had faithfully and steadfastly served this country from the outset of two world wars, passed into history, together with their divisional engineers. What remained, however, benefited from the recently introduced "One Army Concept" which sought greater integration, and therefore understanding, between the Regular and Reserve Armies and the Cadet Forces. Though the Royal Engineers fared better than most in terms of manpower, units were, however, grouped into engineer commands and some lost the intimate contact with other arms and sense of pride fostered by being part of an all arms field formation. The advantage of receiving possibly better engineer training through centralization had to be weighed against that loss and there were some, too, who had doubts about the wisdom of the instant blending of TAVR units and sub-units with Regular Army units. However, having more exercises in Germany over a number of years succeeded in identifying Reserve Army units with their regular counterparts to a far greater degree than had been possible previously. 1969 was probably the nadir of the TAVR. The following year, numbers expanded by 10,000 (mainly infantry), the Ulster Defence Regiment was formed, and thereafter conditions began to improve.

The organization of the Force was examined again in detail in 1973 by the Majury Committee,[1] but their recommendations were strictly limited on grounds of costs, and thereafter though recruiting continued to be good, the rates of wastage rose

steadily, reaching over 30% of the recruited strength in 1977. The Shapland Committee[2] was duly set up to examine this problem and to recommend how the wastage might best be reduced. Among the many proposals adopted in 1979 as a result of this wide ranging study were changes to the terms of service, manning, training and pay conditions of the TAVR and - to the considerable joy of many - a return to the title "Territorial Army".

Ministry of Defence

As part of the rationalization of the three Armed Services, the Minister of Defence announced in the Commons on 4 March 1963 decisions to set up a unified Ministry of Defence, to absorb the existing Admiralty, War Office and Air Ministry, while preserving the separate identities of the three Services. Changes included the setting up of a Defence Operations Executive and Defence Operations Requirement Staff to centralize functions hitherto performed on a single Service basis, though the MGO continued to be responsible for the procurement of weapons and military equipment. The new Ministry was born on 1 April 1964.

Further rationalization took place in 1967 when a Minister of Defence for Equipment was appointed, responsible for land, sea and air equipment; and a Minister of Defence for Administration, responsible for personnel and logistics for all three Services.

In 1974 the Quartermaster-General, General Sir William Jackson, instigated a major study of the system of logistic support for the Army. Central to this study was the recognition that the major function of the UK base was to support BAOR; beside this commitment all others were by now comparatively insignificant. This being the case, support for BAOR should be integral with that for the UK, provided by a base divided only by the inconvenience of the English Channel. In this way there was scope to rationalize and eliminate duplication and also to control support for the "one base concept" by setting up a Logistic Executive (Army) (LE(A)), which duly started to form in Andover in 1977. From the Sapper point of view this study posed a threat to the future of RE Resources for the second time within the period covered by this volume (*see* Chapter II), since some tidy-minded rationalists wished to see these merged with Ordnance stores. It was therefore timely for the Sappers, if for no-one else,

Gen Sir Frank E W Simpson GBE KCB DSO Chief Royal Engineer
March 1961 - June 1967

Troops of 36 Corps Engineer Regiment crossing the Thames on exercise using a Heavy Ferry. *(Courtesy Imperial War Museum)*

Champ being loaded onto an Assault Boat raft

Troops of 36 EngrRegt & Assault Boat Raft

9 Independent Parachute Squadron dropping onto Hankley Common in 1975 after a tour in Northern Ireland

Light Wheeled Tractors of 59 Independent Commando Squadron landing in Norway for Arctic training. *(Courtesy Soldier Magazine)*

9 Independent Parachute Squadron & Light Wheeled Tractors of 59 Independent Commando Squadron

Mark 7 mines being supplied to Mark 3 mechanical minelaying train

Ramped Powered Lighter of 10 Port Squadron off Brunei.
(Courtesy Imperial War Museum)

Mark 7 mines being supplied to Mark 3 Mechanical minelaying train & Ramped powered lighter of 10 port Sqn off Brunei

that the Turks invaded Cyprus at this moment. As will be seen in Chapter VIII, 35,000 refugees had to be given shelter very quickly indeed. RE Resources in the UK and in Cyprus responded speedily and effectively, and the benefits of a dedicated support service for the Corps, completely familiar with and alert to its needs, was demonstrated yet again and at a uniquely critical moment.

UK Commands

Meanwhile reorganization of the UK Command structure was underway. On 1 April 1968, Southern and Eastern Commands were amalgamated and a new Army Strategic Command formed with its Headquarters at Wilton. In line with the new "one base" concept for operations worldwide, this Headquarters had most of the Field Force Units stationed in the UK (less the brigade from BAOR) placed under its command. Four years later, however, as a result of the Stainforth Committee recommendations, Command Headquarters were abolished and their functions delegated to nine District Headquarters, and Wilton became HQ United Kingdom Land Forces.

EQUIPMENT PROGRAMME

General Service Equipment

Despite the financial stringencies the Army was almost totally re-equipped in clothing, radios, small arms and general purpose vehicles over the 1960s and 1970s, thus finally shedding any remnants of its World War Two image. In the early 1960s the combat jacket and boots directly moulded sole (DMS) replaced battle dress and boots ammunition; a succession of faithful 0.303 inch calibre Lee Enfield rifles were replaced by the 7.62 mm Self Loading Rifle (SLR) as the personal weapon; the No 19 HF radio was replaced by the VHF C42; and by 1965 FV 430 Series tracked armoured personnel carriers were appearing, initially in infantry battalions and soon in other arms units. The ubiquitous Land Rover became the universal light vehicle for the Army, after a short lived flirtation with the Champ. Some milestones in the army re-equipment programme over this period are given in Table 1.

Defence Sales

An area of growth at this time was the sale of Defence

Equipment. Until the mid-1960s each of the three Armed Services had its own sales branch, chiefly responsible for controlling the disposal of surplus equipment and sale of products of the Royal Ordnance Factories. In 1966 the Minister of Defence invited Sir Donald Stokes, Managing Director of Leyland Motors and President of MIRA, to advise on a sales organization that would help obtain a larger share of the world market for the United Kingdom. As a result a unified organization under a Head of Defence Sales was set up and defence exports became big business. The volume of military sales handled by the sales organization more than doubled from £150 million in 1969 to £425 million in 1974, and reached £800 million in 1978.

FOOTNOTES TO CHAPTER 1

1. TAVR Review Committee chaired by Major General J H S Majury CB MBE.
2. TAVR Wastage Committee chaired by Major General P C Shapland CB MBE.

TABLE 1: OUTLINE ARMY RE-EQUIPMENT PROGRAMME 1960-1980

(Note: Dates shown are those on which issues started generally to units)

1960	Larkspur net radio introduced eg., C42 replaced No 19 set. 1 ton GS vehicles replaced 15 cwt trucks.
1961	7.62mm Self Loading Rifle replaced 0.303 inch No 4.
1962	Combat suit and DMS boots replaced Battledress. 7.62mm L7A1 GPMG replaced Bren Light Machine Gun. Gillois amphibian purchased.
1963	Vigilant anti-tank guided weapon. Centurion AVRE and Bridgelayer.
1964	FV 432 Armoured Personnel Carrier. FV 433 Abbot Self-Propelled 105mm Gun.
1965	Stalwart High Mobility Load Carrier. Centurion Ark.
1966	Austin Champ phased out. Conqueror withdrawn.
1967	Chieftain started to replace Centurion main battle tank.
1968	Class 16 Air Portable Bridge.
1969	Eager Beaver rough terrain fork lift truck. M2B amphibian.
1971	MGB introduced.
1972	Scorpion 76mm Fire Support Combat Vehicle. Barmine and layer.
1974	105mm Light Gun to replace Pack Howitzer. Chieftain AVLB.
1975	Clansman net radio.
1976	Aids to amphibians.
1977	Light Mobile Digger.
1978	Combat Engineer Tractor.
1979	Combat Support Boat.

CHAPTER II

THE CHANGING SAPPER SCENE

INTRODUCTION - CHANGES IN ROLE OF THE ROYAL ENGINEERS - Growth of the Military Engineer Services - Transfer of Responsibilities of RAF Airfield Construction Branch to the RE - The McLeod Committee - Transfer of Transportation to the Royal Corps of Transport - Retention of Resources - CHANGES IN ROLE AND ORGANIZATION OF HEADQUARTERS ENGINEER-IN-CHIEF (ARMY) - Situation in 1960 - Dispersal to Chatham 1965 - Engineer Plans - Transportation - Return to London 1970 - CHANGES TO UNIT ESTABLISHMENTS - General - RE Air Troops - ENGINEER EQUIPMENT AND ITS PROVISION - Background - Development and Procurement - Bridging - Armoured Engineer Equipment - Minewarfare Equipment - Earthmoving and Construction Plant - INTERNATIONAL LIAISON.

INTRODUCTION

Over the period with which we are concerned in this volume, the changing climate described in the previous chapter was reflected in major changes in the role of the Royal Engineers, in particular in three important areas: a growing responsibility for Military Engineering Services, the assumption of full responsibility for Airfield Construction from the RAF, and the transfer of Transportation including Movement Control to the newly formed RCT. In addition, new pressures including increasing financial constraints led to changes within the Corps in its management, its organization and its equipment, and these too will be discussed in this chapter.

CHANGES IN ROLE OF THE ROYAL ENGINEERS

Growth of the Military Engineer Services

By the middle of 1960, the formation of a War Department Works Organization had been formally approved, based largely on the recommendations of the Weeks Committee, as described in Volume X. It had been recognized that there would always be occasions when a fully civilian organization would not be able to carry out its duties, for example when operational warlike constraints prevailed, and it would therefore be necessary to have a military force available for such emergencies. Consequently, an Engineer Specialist Services Establishment

(ESSE) had been set up in 1959 to provide this capability. 311 posts were established within the newly forming War Department Works Organization, 55 were earmarked for attachments to civilian firms and 17 were established on the staff of various headquarters. By rotating personnel through these specialist posts, the Royal Engineers were able to retain a substantial number of officers and men with appropriate engineering experience.

In 1963 an important political decision was taken to centralize all Government building operations into a new Ministry of Public Buildings and Works (MPBW). This absorbed all three Service Works Departments, and was significant because the White Paper announcing it stated that the functions of the new Ministry included "meeting the construction needs, including operational works, of the Armed Services and of the Ministry of Aviation".

Weaknesses in the system had, however, already become apparent, in particular the inability of a civilian works organization to respond readily to emergencies and hostile or unexpected situations. It was realised that such calls could best be met by Royal Engineers, but that RE personnel occupying integrated posts in MPBW would be difficult to extract at short notice - for example, works support for an emergency reinforcement for British Guiana in 1964 had to be provided by an officer being detached from the staff of the RSME. But it was not until 1965 that a reorganization of ESSE was approved, leading to the formation of a CRE (Construction) and three Specialist Teams RE (Construction) (STRE(C)), while the integrated posts within MPBW and elsewhere became the Military Engineer Services (MES) Training Element. Experience during the hostilities in Aden and Borneo reinforced the need for the conditions under which Royal Engineers would carry out works services for MPBW to be clearly laid down, and these were agreed in 1965 to be:

> In areas where it was impossible to obtain adequate civilian labour or where a normal contract would be impractical or excessively expensive.
>
> In emergency when local resources could not complete the work within an acceptable time.
>
> Where the work would provide valuable training for the RE.

Airfield construction work and allied works by Field Squadrons (Airfields).

A further reorganization took place in 1970 following more experience in emergencies. This involved the formation of a CRE (E&M) and the inclusion under its command of the existing STREs (Well Drilling) and (Bulk Petroleum) and the disbandment of a CRE (Construction) (TA). MES comprised two parts: MES (Works) (formerly the Training Element) and MES (Field) which consisted of a CRE (Construction) with its STREs, the new CRE (E&M) and a Colonel E in HQ 12 Engineer Brigade which had been formed at Barton Stacey in 1965 and which was commanding the Corps Engineer Regiments at Ripon and Maidstone. MES (Field) was available at short notice to meet emergency works service commitments; MES (Works) was available for re-deployment for longer term commitments and to relieve MES (Field) when operations or emergencies became prolonged.

During the late 1960s it also became clear that the standard of expertise in construction engineering within the Royal Engineers was becoming eroded and that action was necessary to reverse the trend. Increased emphasis was placed on construction engineering in the training of all young officers and the supervision, direction and training of the RE specialists was improved by concentrating a substantial proportion of them into the new specialist teams. In addition, by giving up the more routine MPBW integrated posts and reducing the total to 179 it was possible to make 43 posts available for attachment to more demanding tasks with civilian firms. In 1970 MPBW was absorbed into the Department of the Environment and in 1972 became the Property Services Agency. These changes, however, did not affect the organization of the Military Engineer Services.

In 1979 the responsibility of Royal Engineers for works services in peace and war was promulgated in a Defence Council Instruction. In outline, this was to carry out all the PSA's normal responsibilities for works services in support of the Armed Forces in circumstances when the PSA's civilian organization (using contract and local labour) could not provide them. Such circumstances would arise in war and military operations when hostilities, civil unrest or security implications made it impossible or unwise to use civilians; and when the work could not be completed by civilian means in an acceptable time.

Examples over this period when the Royal Engineers assumed responsibility for Works Services were:

When the location was remote and lacking in amenities and the cost of employing a civilian agency prohibitive, such as the manning of the St Kilda power station from 1975 onwards.

When there were operational and warlike conditions prevailing. Examples of this included the replacement of up-country civilian supervisors in the Western Aden Protectorate in 1964, the manning of the Salalah Sub-Depot in 1970 and operations in Northern Ireland and Borneo.

In locations where no civilian contractor was available, such as the construction of Europa Road, Gibraltar in 1973.

In locations where, for security reasons, a civilian contractor could not be employed, for example in the construction of Communication Centres or sensitive areas in Berlin.

Where the speed of reaction required by the Armed Forces could not be met by the PSA, for example at Long Kesh Camp (1971), Marchwood roll-on roll-off facility (1972) and RAF Wittering aircraft loading facilities (1974).

In 1977, HQ Engineer Support Group (ESG), which was then stationed in Woolwich Arsenal, was advised by HQ Engineer-in-Chief (E-in-C) that it would move to Barton Stacey early in 1978 and take the Military Works Force (MWF) under its wing. The intention was to bring together the whole support side of the Corps in one group, including stores, stores handling, workshop production, plant holding and management and at the same location provide centralized expertise for the design and planning of construction tasks. At the same time, a Technical Information Centre RE (TICRE) was established at Barton Stacey, where copies of all project reports could be retained for future reference.

Col E 12 Engineer Brigade thus became the Commander Military Works Force which remained at Barton Stacey and comprised:

HQ Military Works Force. A small coordinating and administrative headquarters with the Technical Information Centre.

62 CRE. A headquarters and three STREs (Construction).

64 CRE. A headquarters, 516 STRE (Bulk Petroleum), 520 STRE (Electrical and Mechanical) and 521 STRE (Well Drilling).

The new Headquarters Engineer Support Group now located at Barton Stacey also commanded Engineer Resources at Long Marston, the whole coming under the technical direction from the MOD of Director Engineer Services (DES).

Transfer of Responsibilities of RAF Airfield Construction Branch to the RE

The Corps had always had a responsibility for the construction of airfields and tactical airstrips in operational areas. In addition, the RAF had possessed for many years its own capacity for urgent, local, operational work in the form of its Airfield Construction Branch (ACB). Its roles included the extension of existing airfields, their repair and maintenance and the erection and maintenance of installations and buildings on them. Despite the nature of this work, when the decision was taken in 1963 to transfer the responsibilities for Works Services from the Service departments to the MPBW, the ACB was specifically excluded. Indeed, in the same year, as a result of a separate review of its roles by the Air Council, the Branch was increased in size from three squadrons to four.

Meanwhile, however, the long term division of responsibilities between the Services was under constant review and in 1964 the Defence Council announced that the Royal Engineers should take over the roles of the RAF Airfield Construction Branch. Initially, it was proposed that these duties should be carried out by a special regiment placed under RAF command, with a suitable title such as Air Formation Engineers.

Inevitably, since the first uncertainties about their future had been voiced, recruiting for the Branch had been considerably impaired. Though small in numbers - about 50 officers and 750

airmen - they were composed of highly skilled professional engineers whose transfer to the Corps would have been most valuable. However, because of the difficulties described in Chapter X, it was unfortunate that only half the officers and a third of the airmen did so.

As a result of the handover, the Royal Engineers' responsibilities for Airfield Construction work were redefined in 1964 as follows:

In War.

Construction or extension of airfields in operational theatres.

Repair and maintenance of existing airfields.

Maintenance and operation of installations on airfields.

Erection of temporary buildings and installations.

In Peace.

Execution of work in areas where the use of contractors was impracticable or difficult because of such factors as geographical remoteness, emergency conditions and labour unrest.

Assistance in maintaining essential services in the Near, Middle and Far East in the event of withdrawal of local labour or when there was a need to supplement it by reinforcement from the United Kingdom.

Execution of urgent works services on behalf of the RAF.

Execution of specific works services at home and abroad on behalf of the Ministry of Public Buildings and Works.

Additional Special Tasks.

Maintenance of large scale air conditioning and refrigeration plant installed at certain radar and similar stations.

Provision of standby personnel and equipment to help in the speedy recovery of crashed aircraft.

Provision of standby personnel and equipment in case of nuclear contamination as a result of an aircraft crash or similar accident.

After some discussion it was agreed that the RAF airfield at Waterbeach, which had been the depot of the ACB, should be the Headquarters of the new Army Airfield Construction Regiment and it was formally handed over on 1 July 1966. The Royal Engineer squadrons to take over from the RAF were to be formed and numbered as follows:

10 Field Squadron to take over from 5004 Airfield Construction Squadron.

51 Field Squadron to take over from 5001 Airfield Construction Squadron.

52 Field Squadron to take over from 5002 Airfield Construction Squadron.

53 Field Squadron to take over from 5003 Airfield Construction Squadron.

The McLeod Committee

In the early 1960s the Army Council decided that the time had come for a comprehensive review of the logistic organization in the Army. The need arose primarily from the increasing pressures for economies in manpower and money, which encouraged the adoption whenever possible of an inter-service approach to logistic matters. A committee[1] was therefore appointed by the Army Council on 21 March 1963 under the chairmanship of General Sir Roderick McLeod. The terms of

reference of the committee were to review the whole of the existing structure of the Q Services, with a view to deciding whether any changes were necessary in the interests of increased efficiency and greater ease of control, or the more economical use of manpower and materials, in both peace and war.

The committee identified three main functional areas of their concern, which were Supply (including provisioning, receipt, storage and issue of all forms of material), Transportation (including the movement of all items of supply and personnel) and Repair. Under the divisions of responsibility existing at the time, the Royal Engineers were responsible within these areas for the supply of certain engineer stores, plant, machinery marine craft and their spares; transportation as it affected ports and beaches together with their associated craft and cargo handling facilities, inland water transport and railways; and repair at unit level of certain items of engineer equipment.

The Committee recommended that all supply responsibilities should be centralised in one Supply Corps. This Corps should be formed by the amalgamation of the RAOC, the supply element of the RASC, and the RE Stores Organization (but not the RE field park squadrons). They also recommended the formation of a Transportation Corps to be formed by amalgamating the RE Transportation and Movement Control services, and that portion of the RASC concerned with transport. As far as repair was concerned, the Committee recommended that REME should be retained as the Repair Corps. The Committee also examined proposals for a Technical Corps, formed by combining RE, R Signals and REME; and examined the possibility of separating electronics from other forms of engineering by setting up an Electronics Corps. In the event, however, both these last two ideas were discarded.

Transfer of Transportation to the Royal Corps of Transport

During the course of the Committee's investigations, it was made clear to them that the Corps of Royal Engineers had in the past attracted a high grade of officer partly because of its ability to offer a wide variety of professional tasks in both civil and military engineering. Such opportunities had, however, already been diminished by the transfer of responsibility for works services to the MPBW, and the new proposals for transfer of transportation

duties to a Transportation Corps and engineering resources to a Supply Corps would entail a further erosion of the scope of the Royal Engineers. In the early years with which this volume is concerned these transportation elements of the Corps were still quite considerable. In early 1962 there were in addition to the Transportation Centre at Longmoor a number of operational units including 17 Port Regiment at Marchwood, consisting of 51, 52 and 53 Port Squadrons, a lighterage troop in Cyprus and 10 Port Squadron in Singapore. 8 Railway Squadron was based at Longmoor, and a Strategic Reserve Movement Control Squadron at Wilton supplied Air Transport Liaison Officers (ATLOs) at RAF Lyneham and Abingdon. 1 Railway Group were responsible for the running of War Department railways at sites such as Didcot, and at all Ministry of Supply depots, ranges and the Royal Ordnance Factories. The total railway responsibility at this time amounted to 100 locomotives, 2000 wagons and 645 miles of track at 110 different locations. The RE commitment to Movement Control was also significant and in the process of change. Of the six troopships in regular service in 1959, none remained by the end of 1962 as airtrooping even to Germany became the norm, creating a much more continuous load for those responsible for the handling of the troops and their families. On 15 July 1965, when all these functions were handed over to the RCT, the manpower cover for 192 officers and 1196 other ranks went with them. On that day all the regular units above, including the Transportation Centre, Railway Regiment and Port Regiment in the United Kingdom and port squadrons in the Near East, Middle East and Far East ceased to wear the RE cap badge.

Retention of Resources

When the Army Council considered the McLeod Report in February and March 1964, the view was strongly represented that the RE resources organization should not be transferred to a Supply Corps until the implications of this had been studied further, with particular reference to the safeguarding of the professional standing of the Royal Engineers. The QMG was therefore invited to arrange for a working party to examine these implications in detail, and a committee was duly set up on 8 October 1964, under Major General W Odling[2]. The terms of reference of this committee were to determine:

What economies, if any, would be achieved if the responsibilities for provisioning, procurement and holding of stores currently carried out by the Royal Engineer resources organization was taken over by the RAOC.

Whether the responsibilities for repair could be taken over by REME and, if so, what economies would arise.

What effect the transfer of these responsibilities would have on the operational capacity, viability and career structure of the Royal Engineers.

The existing RE resources organization was at this time responsible for the following basic functions:

Provision, procurement, holding and maintenance in depots of the engineer stores required for those work services for which RE were responsible, the support of the RE during civil emergencies, training by units of all arms and other special engineering use.

The manufacture of requirements peculiar to a theatre for both field and static use.

The repair (including the provision of the necessary spares backing) of all special engineer equipment.

The provision of specialist manpower for reinforcing units in operations and emergencies.

The case for transferring the supply functions to the RAOC rested on the desirability of establishing a single Supply Corps in the Army which would have a more specialized expertise than an organization in which store holding was a secondary function. However, it was agreed that stores for an engineer project could only be determined by a system of provision which took into account the technical specification, local availability and local conditions; and, with the exception of bridging and the general range of project stores, it was not usually possible to pre-stock such material in precise detail before the making of an engineer plan. It followed therefore that selection and modification of stores for a particular job was an engineering rather than a stock keeping task[3].

The committee therefore concluded that the RE Resources organization was still required, though with its function somewhat modified; in particular, it was felt that the reduction in workload arising from the reduction in size of the Army and the loss of responsibility by the RE for works services would allow the concentration of these resources functions within UK into one central depot. The findings of this committee were endorsed by the Army Board in 1967. Their recommendations led to the closure of 2 Engineer Stores Depot at Liphook and the Spares Sub Depot at Longmoor and the transfer in 1967 of their stocks to 1 Engineer Stores Depot at Long Marston. This became the only remaining resources depot and was renamed Central Engineer Park accordingly. In the same year HQ Engineer Stores Establishment (UK) which had moved to Woolwich in 1963 became HQ Engineer Support Group.

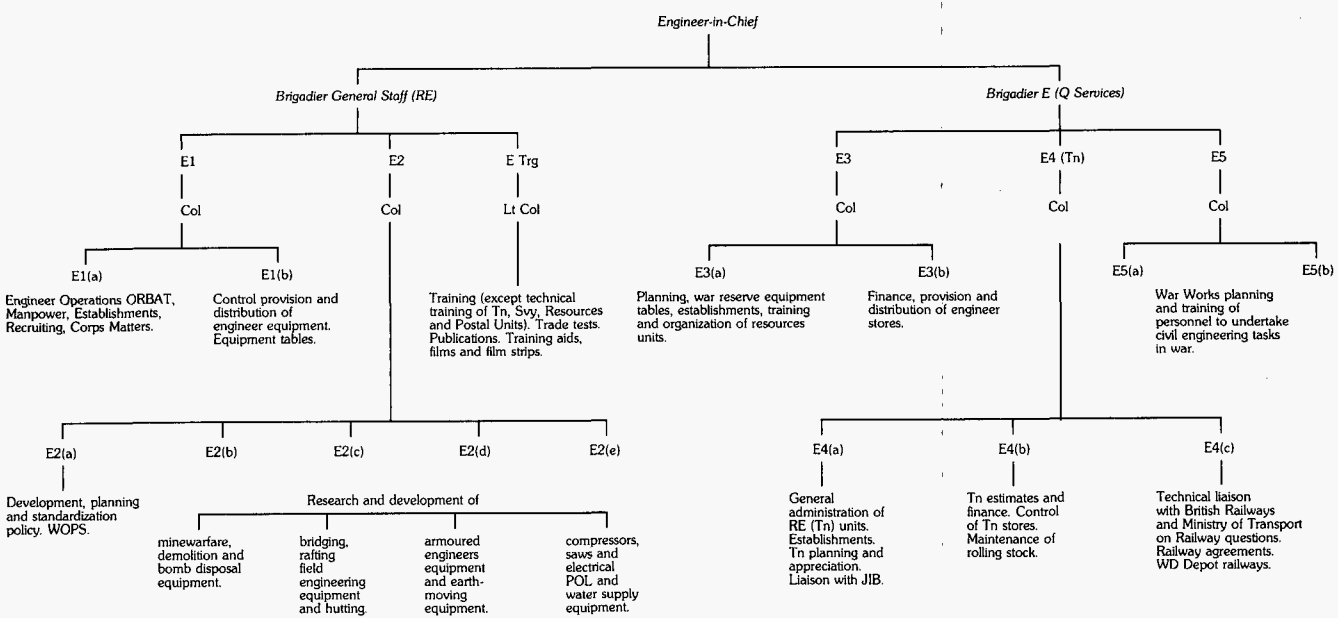
CHANGES IN ROLE AND ORGANIZATION OF HEADQUARTERS ENGINEER-IN-CHIEF (ARMY)

Situation in 1960

On 1 January 1960, the Directorate of the Engineer-in-Chief (Army) was organized as shown in Figure 1 on the following page. In general, the branches were in two groups: those responsible for operations, equipment and training (E1, E2 and E Trg) under the Brigadier General Staff (RE), formerly Deputy E-in-C and those responsible for Stores and Works (E3 and E5), to which had recently been added Tn (E4), under the Brigadier E (Q Svcs). The whole Directorate was housed in the Old War Office Building Whitehall.

In 1963, coincidentally with the decision to set up a unified Ministry of Defence in London, the Nye[4] Committee on War Office Organization recommended a number of functional changes, which considerably reduced the responsibilities of Arms directors and removed them from the Ministry of Defence. Consequently during 1964 the whole of the E-in-C's previous responsibilities for engineer operations, deployment, organization and manpower were transferred to the Directorate of Army Staff Duties (ASD7), and sponsorship and policy on engineer equipment passed to a new Directorate of Army Equipment Policy (AEP7). The Brigadier E (Q Svcs) became Brigadier Engineer Plans, responsible directly to the Vice

FIGURE 1 ORGANIZATION OF THE ENGINEER-IN-CHIEF's DIRECTORATE ON 1 JANUARY 1960

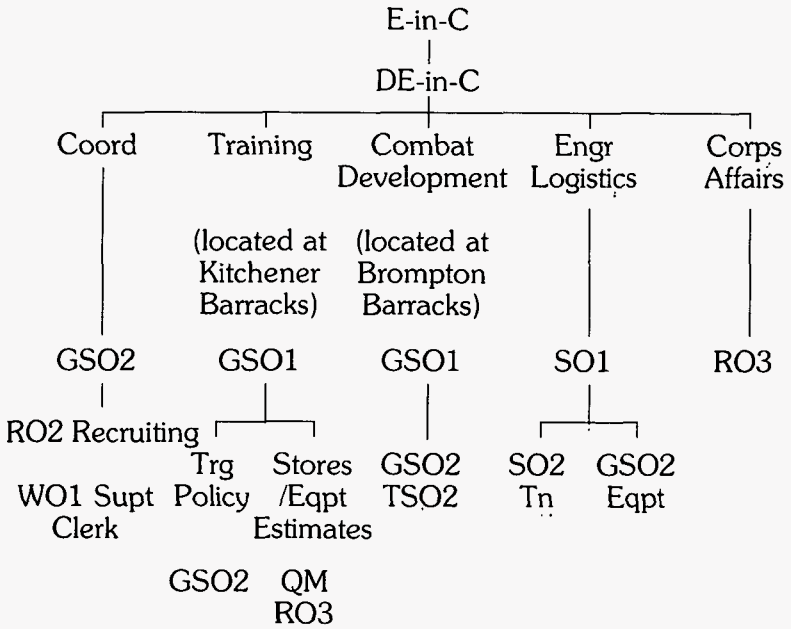

Engineer-in-Chief
Brigadier General Staff (RE)
Brigadier E (Q Services)
E1
E2
E Trg
E3
E4 (Tn)
E5
Col
Col
Lt Col
Col
Col
Col
E1(a)
E1(b)
E3(a)
E3(b)
E5(a)
E5(b)
Engineer Operations ORBAT, Manpower, Establishments, Recruiting, Corps Matters.
Control provision and distribution of engineer equipment. Equipment tables.
Training (except technical training of Tn, Svy, Resources and Postal Units). Trade tests. Publications. Training aids, films and film strips.
Planning, war reserve equipment tables, establishments, training and organization of resources units.
Finance, provision and distribution of engineer stores.
War Works planning and training of personnel to undertake civil engineering tasks in war.
E2(a)
E2(b)
E2(c)
E2(d)
E2(e)
E4(a)
E4(b)
E4(c)
Development, planning and standardization policy. WOPS.
Research and development of
General administration of RE (Tn) units. Establishments. Tn planning and appreciation. Liaison with JIB.
Tn estimates and finance. Control of Tn stores. Maintenance of rolling stock.
Technical liaison with British Railways and Ministry of Transport on Railway questions. Railway agreements. WD Depot railways.
minewarfare, demolition and bomb disposal equipment.
bridging, rafting field engineering equipment and hutting.
armoured engineers equipment and earth-moving equipment.
compressors, saws and electrical POL and water supply equipment.

Quartermaster General for engineer logistic planning and military works, and for the newly acquired airfield construction tasks.

Dispersal to Chatham 1965

As a result the E-in-C Directorate was emasculated considerably, its residual responsibilities being limited to some aspects of recruiting, training, combat development, logistics and Corps affairs only. Much reduced in numbers, therefore, it duly left Whitehall and reformed at Southill Barracks, Chatham on 1 January 1965 organized as follows, leaving ASD7 in Whitehall as the Engineer-in-Chief's General Staff representative in the Ministry of Defence.

HEADQUARTERS ENGINEER-IN-CHIEF (ARMY)



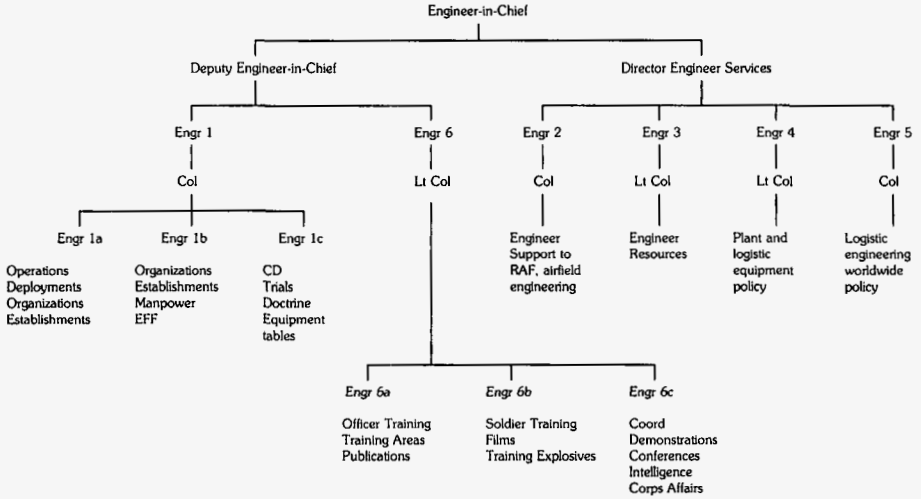
Engineer Plans
Brigadier Engineer Plans branch was simultaneously fragmented: Engr 1 (Construction) and Engr 3 (Resources) were in Golden Cross House while Engr 2 (Airfields) was in Northumberland House.

Transportation
With the formation of the new Royal Corps of Transport, the functions of the old E4 branch concerned with Transport were transferred to Director of Supplies and Transport (Tpt 2).

Return to London 1970
The separation from the centre of activity and decision making in London might have been acceptable for other Arms Directors, such as Director Royal Armoured Corps at Bovington and Director Royal Artillery at Woolwich, but because of his additional direct responsibilities to the Quartermaster General it proved unworkable for the Engineer-in-Chief, and by 18 December 1967, the Engineer-in-Chief, the Deputy and a very small staff had re-established a tactical headquarters in Whitehall. The need was soon officially recognized and the main headquarters returned to London from Chatham in 1970. On 12 June of that year they reopened at Empress State Building in Earls Court, (less Engineer Training and the Royal Engineer Combat Development Staff which remained at Chatham), where they were joined by the Engineer Plans Directorate on 1 October.

Engineer Training rejoined the Headquarters in London in December 1972. Finally the drama turned full circle when on 20 December 1973 the Directorate moved back to Whitehall to re-occupy almost the same offices it had vacated nearly nine years earlier, and in which ASD7 (now renamed Engr 1) had remained throughout. Director Engineer Services (formerly Engineer Plans) and his staff had moved to the Old War Office Building Whitehall from the Empress State Building in April 1974. The resultant organization is shown in Figure 2 overleaf, and thus it remained for the rest of the period with which we are concerned.

FIGURE 2 ORGANIZATION OF THE ENGINEER-IN-CHIEF'S DIRECTORATE ON 1 JANUARY 1975



CHANGES TO UNIT ESTABLISHMENTS

General

In 1958, the majority of field squadrons were on a standard war establishment, irrespective of the theatre in which they served. Despite being grouped in regiments, they had to be capable of prolonged independent existence and were therefore nearly 240 strong (all ranks), with two officers in each troop; and they were self sufficient in vehicles, trailers and plant (the latter including a Size IV tracked tractor carried by road on a ten ton GS vehicle). By far the commonest trade amongst the sappers, partly because so many were National Servicemen, was Field Engineer (later retitled Combat Engineer). A few were Non Tradesmen (for duty as Medical Orderlies and Motor Cyclists) or held comparatively lowly skills as Plant and Engine Hands. Units at that time were responsible for their own first line vehicle repair and RE Vehicle Mechanics were established accordingly.

By the early 1960s, the ending of National Service and the reduction to an all-Regular Army was in sight. In addition, the growing importance of the Strategic Reserve in the United Kingdom gave rise to the need for specially equipped units including Airportable Field Squadrons. These units were not as strong in numbers as their predecessors, but included an integral support troop and much more earthmoving plant including a grader, a light wheeled tractor for each troop and two medium wheeled tractors in the squadron. It had been relatively easy in most theatres to sustain two officers per troop in the National Service Army, but this could not be continued in the all Regular Army, so troop sergeants were upgraded to staff sergeants, and eventually an administrative officer was included in squadron headquarters. The vulnerability of solo despatch riders to ambush had caused the withdrawal of the majority of motor cycles from units by this time; and the enormous variety of tasks which units seemed to have to face had been matched by providing a greater diversity of trades within them than before.

The end of the 1960s saw the arrival of the tracked FV 432 Armoured Personnel Carrier in field units in BAOR, bringing with it new problems of increased maintenance load, considerably increased radio communications, and a shortage of carrying capacity for both stores and men. New establishments took these into account, further reducing the

squadron strength to 176 all ranks, and centralizing the plant under regimental arrangements. One of the implications of these changes was that as the quantity of equipment held by squadrons specifically for combat engineering increased and their working strengths diminished, so their ability to switch quickly to civil engineering tasks was reduced. Increasingly, therefore, successful completion of such projects became dependent upon the availability of Specialist Teams RE to provide assistance. These trends continued throughout the 1970s. The particular effects of these changes as they affected BAOR are considered in greater detail in Chapter III, but illustrative examples from the War Establishments of field squadrons which in 1958 were standard compared with those of the middle 1970s by which time squadrons in Germany had APCs while those in UK were airmobile, are given below:

Comparison Between War Establishments

	Standard Field Squadron 1958	Field Squadron In UK 1974	Field Squadron In BAOR 1976
Officers	9	7	7
Tradesmen (RE trades)	38	85	39
Tradesmen (other) (eg clerks, signallers, drivers)	48	43	48
Field/combat engineers	117	33	64
Non tradesmen	6	–	–
Total rank and file including SNCOs	228	191	169
A Vehicles	4	4	25
B Vehicles (inc motor cycles)	31	27	16
C Vehicles	1	6	–

It is also significant that the UK squadrons were numerically stronger, had more tradesmen and still retained their own integral plant, unlike their BAOR counterparts.

RE Air Troops

Since its inception in 1957 the Army Air Corps had consisted of a small permanent cadre of officers who had transferred from other arms, augmented by officers and NCOs attached for flying tours at the end of which they returned to their parent regiments or corps. In 1961 plans were made to improve aviation support for teeth arm units by establishing air troops manned by pilots of the same cap badge. Accordingly, by the end of 1965 sufficient RE pilots had been trained for two RE Air Troops to be formed, one each attached to 1 and 2 Division RE respectively. In August 1966 a FARELF Air Troop was also formed, followed a year later by a fourth attached to 4 Division RE in BAOR.

Each troop consisted of three Sioux helicopters and their Sapper pilots supported by a handful of REME ground crew and a pair of vehicles, and the aircraft proved invaluable in reconnaissance, liaison and transportation roles. The troop in the Far East was initially based at Kluang in Malaysia with the Gurkha Engineers and from early 1967 two of the helicopters were attached to the Post Crown force in Thailand until the end of that project. In March 1969 the troop moved to Kota Tinggi and came under command of the Jungle Warfare School until it was disbanded in 1971 when the ANZUK force was formed.

Meanwhile, the proliferation of such Air Troops had brought about a degree of decentralization of spares, servicing personnel and flying supervision which was proving unacceptable and many of the troops including the Sapper ones in BAOR were phased out or incorporated into Aviation Squadrons by the end of 1969. Nevertheless, over the period 1 January 1960 to the end of 1970 forty-one RE officers and senior NCOs qualified as Army Pilots, to demonstrate yet another skill within the Corps.

ENGINEER EQUIPMENT AND ITS PROVISION

Background

The considerable changes in defence policy over the period necessitated changes in equipment, but because many of the former were implemented quickly, and the development, testing

and production cycle for any major item still normally took at least seven years to complete, the introduction of the associated new equipment often lagged some years behind.

The decision in the early 1960s to concentrate on a powerful Strategic Reserve, based in England but capable of being deployed rapidly to protect the national interests anywhere in the world, gave rise to the development of an extensive range of airportable equipment, and to much ingenuity and improvisation where time or money was not available for conventional development. The then current Argosy Medium Range Transport (MRT) aircraft restricted the upper weight limit to sixteen tons and the cross section to ten feet square. Where vehicles or earthmoving plant were larger or heavier than the permitted load, they were stripped; in Borneo, for example, where helicopters were used extensively, tractors were knocked down into their component parts to enable them to be carried as underslung loads.

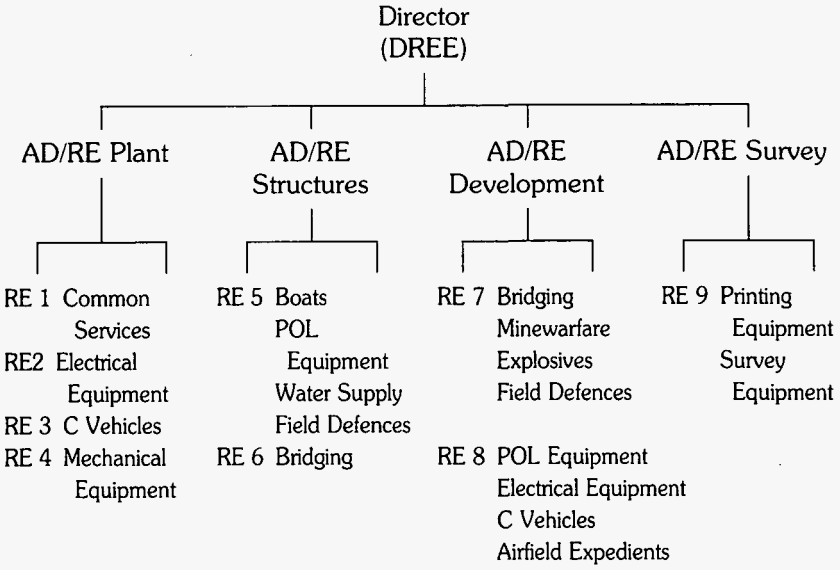
Meanwhile, a powerful conventional capability was also required in Europe. The threat from tactical nuclear weapons continued to give rise to an ever greater need for dispersion, protection and mobility. As a result, there was a general demand for vehicles including tanks to have some amphibious capability so that they could cross the numerous rivers, streams and canals in the deployment area; earthmoving machines in forward units were wheeled rather than tracked to give them higher convoy speeds; and armoured vehicles such as APCs replaced their soft skinned predecessors to raise the level of protection of the working sections. These increases in sophistication brought their own penalties; equipment took even longer to develop and became more expensive (and therefore under greater scrutiny) than before. As a result, it became essential to use commercial engineering equipment wherever possible, to avoid the need for the development of "military specials".

In the second half of the period, the onset of violence in Northern Ireland gave rise to a need for a third category, specialist internal security equipment. Care had to be taken to see that vehicles and plant in particular were non-provocative in this role - for example, tracked AFVs were generally inappropriate, though AVREs were used on one occasion in Londonderry. The principle of minimum force had to be employed in the use of all equipment so the deployment of mines and explosives stores was rigorously controlled.

Development and Procurement

In 1960, the Master General of the Ordnance was responsible within the War Office for the design, development, production, procurement and inspection of weapons, equipments and stores for the Army, and of certain of these items for other Services and Government Departments. He was also responsible for any research required in connection with these functions. Control was exercised for him by subordinate Directors, including the Director Royal Engineer Equipment (DREE), whose branch was staffed at this time by ten military and sixty-four civilian officer posts and consisted of nine sections as shown in the family tree below.

ROYAL ENGINEER EQUIPMENT BRANCH 1960



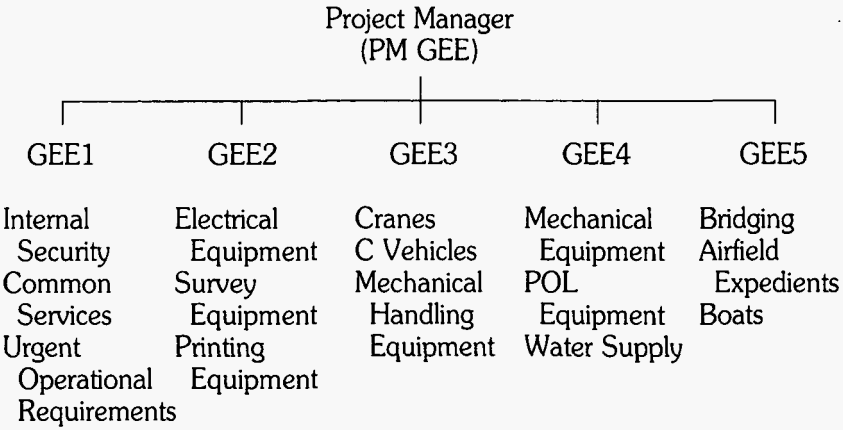
In September 1964, following the Nye Committee report, responsibility for research and development of Engineer equipment became the concern of a new Director of Fighting Vehicles and Engineer Equipment (DFVE), while that for production was held similarly by DFVEP. Thus, matters of production were divorced from their development which, while concentrating expertise, did not necessarily speed up the entry of items into service.

For many years, the Military Engineering Experimental

Establishment (MEXE) at Christchurch had been almost exclusively concerned with the development and testing of products for the Corps, and a very close relationship existed between it and those involved in RE equipment matters in MOD. In 1970, however, MEXE was absorbed into the new establishment replacing the Fighting Vehicles Research and Development Establishment (FVRDE) at Chobham, to be known as MVEE (the Military Vehicles and Engineering Establishment), and thereafter this relationship no longer officially existed.

Meanwhile, on 1 April 1972, as a result of recommendations made in the Rayner Report[5], responsibilities for procurement within MOD were regrouped again, this time on a project basis under Project Managers within a newly formed Procurement Executive. Each Project Manager was once again responsible for both the development and production of either an individual weapon system or equipment family. As such, a Project Manager General Engineer Equipment was included, organized as follows:

PROJECT MANAGER GENERAL ENGINEER EQUIPMENT 1972



Bridging

(See Table 2)

By 1960, it was becoming clear that the wide variety of bridging needed by the Army could not be met satisfactorily by any one general purpose design, but called for a family consisting of:

Airportable equipment, with an upper load carrying classification of 16 tons, for use primarily by the Strategic Reserve.

General War Equipment, for use primarily in North West Europe by armoured vehicles up to Class 60.

Amphibious equipment, of a specialist nature to supplement the General War equipment.

Airportable Equipment. Although large stocks of Bailey bridging were held in overseas theatres, particularly in the Far East, there was clearly a need for a more modern equipment which could carry the majority of loads excluding tanks. The emergence of aluminium alloys which could be relatively easily fabricated provided the opportunity for lightweight modules to be used, and the Class 16 Airportable Bridge was accordingly designed at MEXE. The bridging was based on a light alloy box twelve feet by four feet weighing about 600 pounds which combined the functions of deck and bridge structure, and which could be used in multiples to form either a raft, floating bridge (with the addition of pneumatic floats), or dry gap bridge. The equipment was designed to be readily carried in sets on special trailers which, with their towing vehicles (normally landrovers), could be carried in Argosy medium range transport aircraft. The equipment was accepted for Service use in 1967 and issues started to Strategic Reserve units in 1968.

General War Equipment. In the forward areas where enemy contact was likely, the requirement called for a tank launched bridge which since 1945 had been provided by the Churchill Bridgelayer with the No 3 Tank bridge, providing a Class 60 crossing capability for gaps up to 30 feet wide. In 1963, this was replaced by the Centurion Bridgelayer with a No 6 Tank Bridge (52 feet long) and in 1974 by the Chieftain Bridgelayer with a No 8 Tank Bridge (80 feet long), both also Class 60. As the majority of gaps in North West Europe likely to be encountered in the Combat Zone were appreciably shorter than this, a second bridge 44 feet long, the No 9 Tank Bridge, was issued in 1978 to complement the No 8.

For use in operations when construction could take place out of contact with the enemy, conventional equipment bridging was retained. In the late 1960s, this consisted of Extra Widened

Bailey Bridge and Heavy Girder Bridge for use on dry gaps, and Light and Heavy Floating Bridge on wet gaps and for use on resupply routes. In 1971, however, a new Class 60 light alloy hand built bridge called Medium Girder Bridge was introduced into service. Initially, it was designed as a single span bridge for gaps up to 100 feet wide, but in 1975 the Pier and Span Junction Set was produced which allowed an unlimited number of 84 foot spans to be built. The Span Junction Set also enabled floating bridges to be designed and from time to time various combinations using Heavy Ferry, M2B Amphibious Bridge, Heavy Floating Bridge and Uniflote pontoons were tried successfully. Later still, an MGB Reinforcement Set was introduced which (by hogging the curvature of the bridge) effectively extended the usable span at Class 60 from 100 feet to 160 feet.

Amphibious Equipment. It was foreseen that in any General War in Europe, there would be a requirement to establish crossings over some of the larger rivers more quickly than was possible with conventional equipment. Accordingly, studies were carried out of various self-contained amphibious vehicles, which could move independently to a site, be joined together to form bridges or ferries, and disperse again quickly once their task had been completed. As a result, in October 1961, the French Gillois vehicle was accepted into service and approval sought for the purchase of 60 units which would provide almost 1600 feet of bridge. However, in the middle of the following year, this acceptance was withdrawn in favour of the German EWK M2B which offered technical improvements over the Gillois and comparable production dates, and it was this vehicle which subsequently entered service with the Army.

BR80 Project. In 1969, a meeting of the recently formed Quadripartite Working Group on Bridging and Gap Crossing, embracing experts from America, Britain, Canada and Australia, agreed to initiate collaborative studies into a new family of bridging equipments. Further discussions took place between the ABCA countries and France and Germany, resulting in the setting up of an International Concept Study Team (ICST), based at MVEE, with members from the UK, US and Germany, and the project became known as Bridging for the 1980s, or BR80.

The ICST produced its report in 1974, recommending a concept for a fully mechanized bridging system with maximum

commonality of components used in the three roles of assault, dry and wet support bridging. Fundamental differences still remained between the views of the three countries, however, including the method of launch for the assault bridge and the choice between continuous or discrete flotation for the wet support bridge. Co-operative studies continued in the three countries during what was known as the Interim Phase, and in 1979, a Final Concept Team (FCT) assembled in the US to review national programmes, in an effort to produce a single acceptable concept for trilateral development. The FCT were, unfortunately, unable to produce such a concept, due partly to irreconcilable views between the three countries and partly to changes in the national requirements of the three countries, particularly with respect to essential load class and re-equipment dates.

After further discussions at a high level, the programme ended in the early 1980s, largely because of the financial considerations. Thus ended a genuine attempt to coordinate research and development in the three countries in the field of bridging equipment. For the United Kingdom, the project brought some benefit in that the UK proposals for the bridge girders and for a system for launching the bridges were under active development for the next generation of bridging equipment, known as Bridging for the 1990s or BR90.

Armoured Engineer Equipment

(See Table 3)

Throughout this period, ever-increasing costs and uncertainties of role meant that the quantities of armoured engineer equipment deployed were generally small. In 1960 there was only one operational squadron consisting of three AVRE troops, an ARK troop of linked ARKs, and a flail bridgelayer troop with four of each type of vehicle, all of which were still Churchill based though the rest of the Army had been equipped with Centurion for the previous twelve years.

By 1963, the flails had been withdrawn from service and were held in store and the first Centurion AVREs and bridgelayers with No 6 Tank Bridge issued. At this time, there were plans for a family of armoured engineer vehicles based on Chieftain, but only the bridgelayer was developed, with its No 8 and No 9 tank bridges, which together with the Centurion AVRE remained in service for the rest of this period.

Minewarfare Equipment
(See Table 4)
The main developments in mine design over this period were concerned with increasing the use of non-metallic components (to make detection harder) and unconventional shapes and fuses (to improve each mine's effectiveness). The mass of Warsaw Pact armour facing NATO required a tactic based on speedy laying of long minefields, which was met with the introduction of the barmine layer which could be towed behind the standard armoured personnel carrier, and the Ranger mine which could be scattered from a vehicle mounted dispenser. However, though mining became more sophisticated, countermeasures did not make comparable progress. The search for effective detectors which could discriminate between non-metallic mines and mere battlefield debris or natural objects continued to prove largely intractable; attempts to produce a vehicle mounted device to speed up the clearance of tracks and roads - spurred on by the South Arabia conflict - were finally abandoned in 1967; and breaching methods continued to rely heavily on well tried but laborious hand clearance techniques supplemented by explosive means.

Earthmoving and Construction Plant
(See Table 5)
This era saw the introduction of wheeled tractors to field units on a universal scale; the Michigan 75 Light Wheeled Tractor as the field troop machine and the Medium Wheeled Tractor (initially the Gainsborough and later the Allis Chalmers) for use within field squadrons. The majority of plant used was of commercial design, with one notable exception, the military special Combat Engineer Tractor.

Lindsell Report. At about this time, too, major attempts were made to overcome the growing dissatisfaction with the system for procuring earthmoving and construction plant. The original wartime holdings were reaching the stage where all were obsolete and the system of procurement had resulted in piecemeal buying of a large number of types and makes of each category of equipment, resulting in a huge proliferation of types of spares. Furthermore, a series of changes in the 1950s in the division of responsibilities between RE/RAOC/REME for the repair of plant and the provisioning of spares still left the repair system in an unsatisfactory state. The time was therefore ripe for

a drastic reappraisal of the requirements for such equipments and their methods of provision and management.

In November 1961 a War Office Committee met under Director Royal Engineer Equipment (DREE) "to examine the practicability of introducing a C Vehicle[6] casting policy and to formulate a suggested policy". Subsequently, a C Vehicle review team was set up under Lieutenant Colonel McA P Lonnon, which carried out an exhaustive survey of C Vehicle holdings worldwide. In addition, a working party was set up under the Chairmanship of Brigadier R A Lindsell which made many important recommendations, including:

> Long term holdings of plant should be rationalized on the basis of matched families of equipment.
>
> Future purchases should be based, wherever appropriate, on a five year best buy competitive tendering system, using an improved evaluation and procurement procedure.
>
> The number of special military features called for on plant should be reduced to an essential minimum in order that, wherever possible, requirements should be met by commercial machines.
>
> Commercial C Vehicles and Engineer Construction Plant should be subject to a Casting Policy.

Combat Engineer Tractor. In the early 1960s, a requirement was foreseen for a tractor to carry out engineer tasks in close proximity to forward units, for river crossing, and in a path finder role and which would therefore need to be both armoured and amphibious. Initially, it was also planned that the machine should be airportable in medium range transport aircraft, though this requirement was subsequently dropped. Within these conflicting constraints, it was to be able to shovel, doze, winch and tow with a performance at least equal to the light crawler and wheeled tractors of the day. Three firms - Caterpillar, GKN and Vickers - were invited to carry out feasibility studies to meet the requirement, but in the event their resulting proposals were not accepted.

After consultation with the United States, who were developing a Universal Engineer Tractor with somewhat similar

characteristics, and encouraged by interest from France and financial support from Germany, some test rigs were manufactured at ROF (Leeds) to MEXE design in 1968. Shortly afterwards, France dropped out of the project and Germany followed suit in 1970. The UK then decided to go it alone[7]. Financial restrictions caused some redesign to be undertaken, maximum use of commercially available engine, transmissions and steer units was made, and ROF (Leeds) became Prime Contractor. In the final design the tractor had a 1.7 cubic metre hydraulically operated bucket on the front, a two speed winch, two Dowty propulsion water jets at the rear, a rocket propelled earth anchor on top, and attachments for towing Giant Viper and laying trackway. It was crewed by two men, a plant operator facing the bucket and a driver facing the other way for normal road or cross country movement. The first prototypes were delivered in 1973 and production started in 1977; a total of some 140 were delivered to the British Army for use by field squadrons.

INTERNATIONAL LIAISON

This period saw increasing opportunities for international co-operation, often over the exchange of military technology but also on matters of tactics and training. Under the auspices of NATO, ABCA and FINABEL for example, many Sapper officers participated in Panels, Working Groups and Committees, representing not only their Corps but indeed the British Army. There were also many officers and warrant officers in exchange appointments in places as far removed as Australia, Canada, France and Germany, either in their Engineer Schools or as liaison officers - such as the British Liaison Officer in Washington - providing bilateral communication between the UK and the country concerned. As newly independent countries emerged and formed their own armies, many wished to retain British officers and senior ranks to help with their own development and the RE were duly represented in this role. Ghana was an early example and several officers saw active service in the Congo in 1960 as a result. Other nations such as Kenya, Uganda and Sudan employed Sappers in training teams. The Middle East was a rich field of experience and many served there in a loan capacity, in the United Arab Emirates and Oman in particular.

A great deal of time and effort was also devoted to achieving interoperability between allies by the adoption of standardized procedures. The most widely used examples were the NATO military agreements known as STANAGs. These covered a huge range of activities concerning not only staff work such as the marking of vehicles and the layout of reports and orders but also tactical matters such as the procedures for opposed river crossings, the use of scatterable mines, the provision of emergency water supply and orders for a demolition guard commander. Although such agreements were drawn up primarily for use in operations within the NATO command structure they were accepted by the Ministry of Defence as applicable to the British Army worldwide and the detail in all training documents had to be drawn up to reflect any relevant STANAG requirements.

FOOTNOTES TO CHAPTER II

1. **Composition of McLeod Committee**
   General Sir Roderick McLeod GBE KCB DL (Chairman)
   DGE (Air Ministry)
   VQMG
   AUS(M)
   Assistant Commandant Staff College
   Three other members from MOD
2. The remaining members were:
   DDASD
   Brig Q (Ops and Org)
   D Works Study
   Rep, DD Manning
   Rep, DOAE
   AS, O&M (AD)
3. For example, during the Borneo Campaign, considerable support was provided by the Engineer Stores Group in Singapore which had an Engineer Base Workshop. The EBW had the major specialized task of repairing the many aluminium assault boats and outboard motors (OBMs) which were suffering from heavy operational use and which would have been very costly to replace. The EBW also designed and manufactured a series of lightweight filters for use in isolated water points (see Chapter VI) which were not commercially available.
4. Lieut General Sir Archibald Nye (Chairman).
5. Prepared by Sir Derek Rayner, Chairman of Marks and Spencer, appointed Special Adviser to HM Government in 1970 and Chief Executive Procurement Executive from 1971 to 1972.

6. C Vehicles were defined as mobile items of earthmoving equipment, crawler, wheeled and truck mounted cranes, mechanical handling equipment.

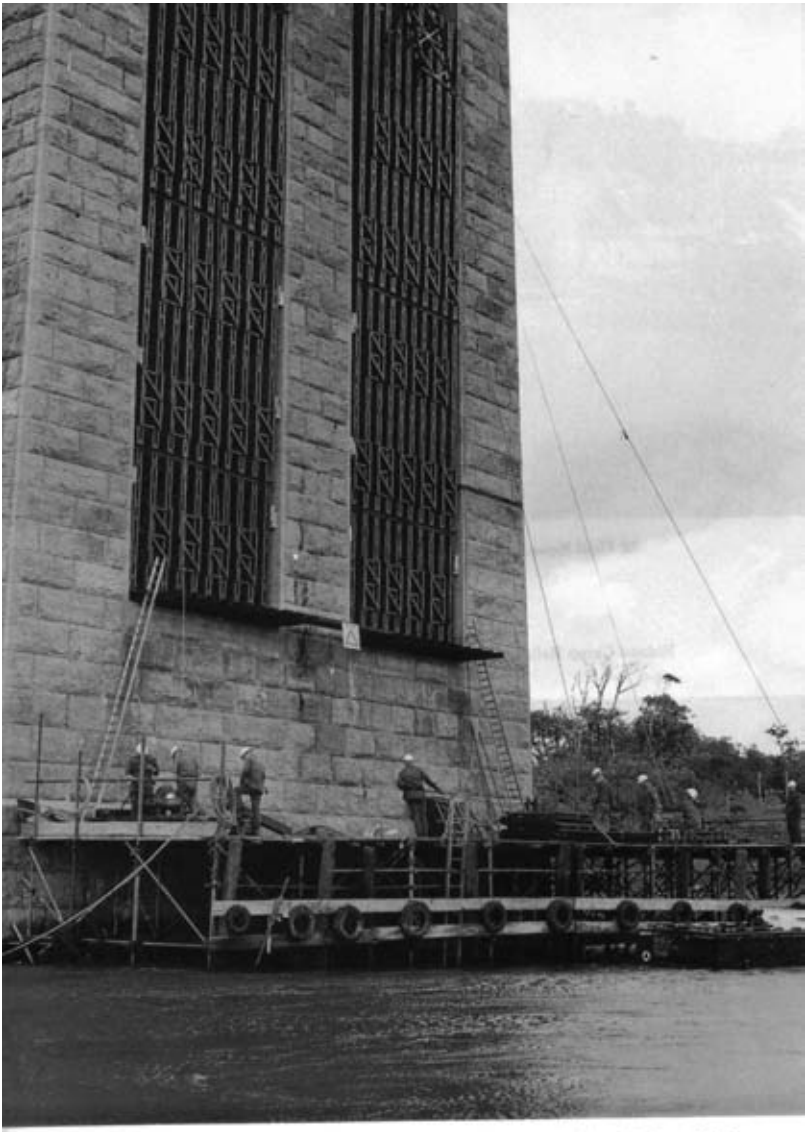
7. It had become apparent that there was insufficient money available in the Defence Budget for the simultaneous development of both an AVRE variant of Chieftain and a Combat Engineer Tractor - particularly as there would be some overlap in their functions. A meeting was therefore called by the E-in-C which most senior RE Commanders attended at which they were each allowed to declare their view, and at which it was also made quite clear that thereafter unqualified support must be given to whichever equipment was chosen or there would be a real danger of the Corps receiving neither. In the event, the CET was chosen and given every encouragement - **and** a limited number of AVREs were also built, but not until many years later.

General Sir Charles P Jones GCB CBE MC Chief Royal Engineer July 1967 -72

Flood relief by members of 36 Corps Engineer Regiment at Maidstone in 1960

Brodick Castle Youth Hostel under construction by 32 Field Squadron in 1968.
(Courtesy Soldier Magazine)

Flood relief by members of 36 Corps Engineer Regiment at Maidstone in 1960 & Brodick Castle Youth Hostel under construction by 32 Field Squadron in 1968.



Bailey panel towers used by 8 Field Squadron during repairs to the Menai Bridge in 1970.
(Courtesy Soldier Magazine)

Bailey Panel towers

32 Field Squadron carrying out bridge repairs in Sudan 1974.
(Courtesy Lt Col J M Bickford)

Rideau Camp Belize under construction by 32 Field Squadron 1978.
(Courtesy Soldier Magazine)

32 Field Squadron carrying out bridge repairs in Sudan 1974 & Rideau Camp Belize under construction by 32 Field Squadron 1978.

TABLE 2: MAIN ITEMS OF BRIDGING EQUIPMENT IN SERVICE USE 1960-1980

	NAME	LOAD CLASS	MAX SPAN	ROADWAY WIDTH	PLANNING CONSTRUCTION TIMES	REMARKS
FIXED BRIDGES	Heavy Girder	100	187 ft	18 ft 10 in	30 Men + Crane 100 ft br in 4 hrs	Introduced 1955 for Main Supply Routes. Longer span available at reduced load class.
	Extra Wide Bailey	80	150 ft	13 ft 9 in	Squadron: 30 min	Introduced 1951 as interim between Standard Widened Bailey and Heavy Girder for Class 80 loads.
	Medium Girder	60	100 ft	13 ft 2 in	Troop: 1 hour	Introduced 1971. Span Junction Sets (introduced 1976) allowed unlimited number of 84 ft spans. Reinforcement Sets (introduced 1980) extended span at Class 60 to 160 ft.
	Airportable	16	50 ft	11 ft 0 in	Troop: 20 min	Introduced 1970. Normally deployed in Standard Bridge Sets, each capable of providing either 192 ft of wet bridge, 4 × rafts or 4 × 50 ft fixed bridges.
FLOATING BRIDGES	Folding Boat Mark III	10	-	8 ft 2 in	2 Troops: 4 hours (for 380 ft)	Entered service before World War II and was only airportable equipment until 1970 when APB was introduced.
	Light Floating	30	-	11 ft 0 in	Squadron: 1½ hours (for 350 ft)	Entered service in 1958 as Light Assault Floating Bridge to carry all divisional loads (less tanks).
	Heavy Floating	80	-	15 ft 0 in	Squadron: 1⅓ hours (for 200 ft)	Entered service in 1962 to carry all divisional loads including tanks.
	Airportable	16	-	11 ft 0 in	Troop: 20 min (for 192 ft)	Entered service in 1970.
RAFTS	Light	30	-	11 ft 0 in	Troop: 1½ hours	Raft version of Light Floating Bridge. Propelled by outboard motors.
	Heavy Ferry	80	-	15 ft 0 in	Troop: 1-2 hours	Entered service in 1957 as tank ferry. Propulsion by 4 Rolls Royce B80 engines driving Gill Water jets.
	Airportable	16	-	11 ft 0 in	Troop: 40 min	Entered service in 1970. Propulsion by 4 outboard motors.
AMPHIBIOUS EQUIPMENT	Gillois	60	-	13 ft 2 in	100 m bridge	Initial purchase of 7 units in 1962 not extended.
	M2B	60	-	18 ft 4 in	60 - 90 min	100 units purchased in preference to Gillois; entered service in 1969.

TABLE 3: ARMOURED ENGINEER EQUIPMENT IN SERVICE 1960 - 1980

Bridgelayers	CHURCHILL	No 3 Tank Bridge, Class 60, 30 ft span.	Remained in service until replaced in 1963 by Centurion Bridgelayer. Steel bridge with "lift and place" launch system.
	CHURCHILL	No 3 Tank Bridge, Mk 2, Class 80, 30 ft span.	Bridge widened and strengthened for Conqueror.
	CENTURION (FV 4002)	No 6 Tank Bridge, Class 80, 45 ft span.	Aluminium alloy bridge with "up and over" launch system.
	CHIEFTAIN (FV 4205)	No 8 Tank Bridge, Class 60, 75 ft span. No 9 Tank Bridge, Class 60, 40 ft span.	Entered service with No 8 bridge in 1974 to replace FVs 4002 and 4016, using "scissor" launch method. No 9 bridge followed in 1978 using "up and over" system.
Armoured Ramp Carriers (ARKs)	CHURCHILL (FV 3901)	Linked ARK, used singly for B vehicles, in pairs for tracked vehicles.	Developed from wartime ARK to carry Conqueror Heavy Tank, entered service in 1955, withdrawn in 1965.
	CENTURION (FV 4016)	Single ARK, Class 80, 75 ft span.	Entered service in 1965, withdrawn in 1977.
Armoured Vehicles RE (AVREs)	CHURCHILL MK VII (FV 3903)	6.5 inch (165 mm) BL demolition gun mounted in turret, capable of firing 61 lb charge effectively up to 1000 yards.	Capable of carrying devices including 10 ton 8 ft diameter fascine, providing 13 ft wide crossing. Entered service in 1954.
	CENTURION MK V (FV 4003)	6.5 inch demolition gun, hydraulically operated dozer blade, 10 ft diameter fascine.	Capable of towing 7½ ton trailer or Giant Viper, and could be fitted with winch for parbuckling fascine onto cradle. Entered service in 1963.
Mine Clearance Devices	CHURCHILL FLAIL (FV 3902)	Separate engine drove rotating drum from which 60 chains were suspended, to detonate or disrupt mines in a 10 ft wide lane.	Markers were automatically fired into the ground as the vehicle proceeded to mark the limits of the lane. After remaining in store for some years, the flail was finally withdrawn in 1965.
	GIANT VIPER (FV 3705)	750 ft long, 2½ inch hose filled with plastic explosive, projected from special 1½ ton trailer by cluster of 8 rockets.	Under good conditions produced a lane 8 yards wide by up to 200 yards long in which all mines (unless blast proofed) were detonated or disrupted. Entered service in 1965. Trailer could be towed and fired by FV 432, CET or AVRE.

TABLE 4: MINEWARFARE EQUIPMENT IN SERVICE 1960-1980

Equipment	Type	Particulars	Entered Service
Anti tank mines	GS Mk VII	30 lb weight containing 20 lb HE, pressure operated, 13 inches dia metallic case.	1950
	L2A1 Light Non-metallic	17 lb weight containing 13 lb HE, pressure operated, 10¾ inches dia non-metallic case.	1969
	L8A1 Barmine	24 lb weight containing 17½ lb HE, multi-fused, rectangular, 48 inches long.	1972
Anti personnel mines	Dingbat	Small, camouflaged, metallic disc, similar to boot polish tin, hand placed.	1952
	Elsie	Inverted cone 3 inches high, non-metallic, capable of being heeled into ground.	1962
	Ranger	2½ inches dia disc, scattered on the surface by vehicle mounted discharger.	1976
Towed minelayers	Mk 3	Towed behind 3 ton load carrier, if necessary pulled by Size II tractor, to lay Mk VII mines.	1952
	Barmine	Towed by FV 432 APC or similar vehicle, could lay 6-700 barmines in 1 hour.	1972
Minefield breaching Equipment	Baby Viper	Rocket propelled explosive hose, which cleared anti personnel mines over a path 150 yards long by 1 ft wide.	1950
	Giant Viper	See Table 3: Armoured engineer equipment.	
	Detector No 4C	Hand held metallic mine detector.	1968

TABLE 5: MAJOR ITEMS OF EARTHMOVING EQUIPMENT AND CONSTRUCTION PLANT IN SERVICE 1960-1980

TYPE (a)	CATEGORY (i) (b)	MAKE/MODEL (c)	PARTICULARS (d)
		TRACTORS	
		(Weights given are approximate operational weights)	
Crawler/ Tracked (ii)	Ultra Light	Bristol PD44 32 HP Wt 7,000 lb	
	Light	Case 1000D 96 HP Wt 20,000 lb	
		International Harvester BTD 6 50.5 HP Wt 12,000 lb	With Drott 4 in 1 bucket. First bought 1960
		Caterpillar D4C 66.5 HP Wt 16,000 lb	Airdroppable version of D4
		Fowler Marshall TM70 73 HP Wt 17,500 lb	Introduced 1966 when CAT ceased production of D4C
		International Harvester 100B	With Bucket loader, backacter, & 4 in 1 Shovel. Entd Svc 1975
	Medium	Fowler Challenger 3M2 91 HP	
		Fowler Challenger 3M3 115 HP Wt 35,500 lb	
		Fowler 33 125 HP Wt 38,000 lb	
		International TD18 103 HP Wt 29,000 lb	
		Vickers Vigor 180 HP Wt 42,500 lb	There was also a Vickers 180C
		Caterpillar D6C (iii) 94.2 HP Wt 35,000 lb	D6C selected 1968 to replace Fowler
		Cat D7C 102 HP Wt 27,000 lb	
	Heavy	Caterpillar D8H 255 HP Wt 61,000 lb	Entd Service 1961
		Caterpillar D8K 300 HP	
		Terex 82-30B 245 HP Wt 70,000 lb	Entd Service 1979 to replace Cat D8H
Wheeled	Ultra Light	Massey Ferguson 203	
	Light	Michigan 75DS, 75A	Leyland 92BHP diesel or Cummins and torque converter. Issue completed 1962 as LWT Standard commercial vehicles 60-100 BHP, 4×4, 14-20, 8081 lbs wt without attachments. 455 succeeded Michigan 75 in 1965.
		Bray BL 455, 450, 460	
		Fordson Super Major	Commercial equipment
		Muirhill A5000 (iii) 124 HP Wt 19,000 lb	Bucket, backacter, entd Svc mid 1970s to replace Bray and Michigan LWT.

(a)	(b)	(c)			(d)
	Medium	Allis Chalmers TL645 (iii)	142 HP	Wt 28,000 lb	Replaced Gainsboro 1968 onwards
		Fowler Gainsborough MK2	145 HP	Wt 35,000 lb	Tractor wh 4×4 medium designed for Svc use
		Terex 72-51			Replaced Allis Chalmers entd Svc 1977
		Michigan 175 Rough Terrain FLT	160 HP		Troop trials 1961, Svc 1962
	Heavy	Michigan 285/275 (iii) Series III Series IV	300 HP 335 HP 380 HP	Wt 60,500 lb Wt 63,000 lb Wt 73,500 lb	Entd Svc 1968 (285 mil spec, 275 commercial based on it). But cancelled 1969, Resurrected for ADR 1973.
Combat Engr Tractor		FV180			Entd Svc 1977. Armd, amph, rocket prop earth anchor, winch, bucket, crane jib
		GRADERS			
Medium		Blaw Knox BK 10 4×4			BK 10 issued 1963. Airportable grader 10 ft mouldboard
		Blaw Knox BK 12 6×4			12 ft mouldboard
		Wakefield Galion 6×4			Several models, 12 ft mouldboard
		Aveling Barford 12 ft Super MGH			6 wheeled drive, front & rear steer Accepted 1968
		EXCAVATORS			
Truck Mounted		BK 50	½ yd bucket	50 BHP on AEC chassis 6×6	Most could be rigged as Face Shovel, Dragline, Backacter, Crane, Grab, Pile Driver
Crawler		10 RB	⅜"	34 BHP	
Wheeled		19 RB	5"	55 BHP	
Tracked		33 RB	1¼"	110 BHP	
		Hymac 590, 580 B	⅝"		Accepted 1968, entd Svc '75
		OTHER EQUIPMENT			
Scraper	Towed	Vickers Onions			Wide variety from 6-18 cu yds struck capacity
	Motorised	Various			Makes included Le Tourneau Westinghouse, Euclid, Caterpillar and latterly Terex. Project equipment not held by squadrons.

(a)	(b)	(c)		(d)
Digger	Light Mobile	Thorney Croft	210 HP	Military special on Nubian chassis with hydraulic digger. Entered Service after prolonged production problems 1977, for rapid digging of slit trenches and pits.
Crane	Bridging Coles	Jones KL66		4/6 ton capacity on AEC chassis entd Svc 1960. Diesel/electric 10/20 ton bridging crane remained in service until mid 1970s.
	Coles Hydra			15 ton capacity entd Svc 1972 to replace previous Coles model.

NOTES TO TABLE 5

(i) Prior to this period, tractors were categorized by a Size rating determined by their Horsepower as follows: Size I over 104 BHP, Size II over 65 BHP, Size III over 45 BHP, Size IV over 35 BHP. In the 1960s this form of description was found to be inadequate and instead all plant was categorized by its airportability. Thus "Light" equipments had to be capable of being lifted by helicopter or dropped on a Medium Stressed Platform; "Medium" to be airportable in Hercules Medium Range Transport Aircraft or dropped on a Heavy Stressed Platform; and "Heavy" was used for any equipment over these limits.

(ii) The majority of tractors were fitted at the rear end with either a winch, or a Cable Control Unit to operate cable operated equipments such as scrapers.

(iii) A number of these machines were fitted with armoured cabs by MEXE after 1969 for use in Northern Ireland. The Cat D6C was originally fitted with an armoured cab for beach minefield clearance on the UK East Coast.

CHAPTER III

BRITISH ARMY OF THE RHINE OUR CONTINUED COMMITMENT IN SUPPORT OF NATO

CONCEPT OF OPERATIONS - ORGANIZATION AND EQUIPMENT - 1 British Corps Units - Field Engineers - Armoured Engineers - Amphibious Engineers - Engineer Support - 38 (Berlin) Field Squadron - Organization Trees - TRAINING - The Training Cycle - Problems of Major Exercises - Minelaying - Bridging - Demolitions - Training in Canada - PROJECTS - Greven Airfield - Bracht Ammunition Depot - The Royal Silver Jubilee Parade 7 July 1977 - OUT OF THEATRE DEPLOYMENTS - The Skopje Earthquake - The Engineer Task - Aden - Northern Ireland - GUESTS OF AN ALLY - Changing Relationships with the German Nation - Exercise Backlash - Hamburg Floods 1962 - Hameln Floods 1966 - Exercise Rough Ramble - Freedom of Hameln - A WAY OF LIFE.

CONCEPT OF OPERATIONS

While the USA had, in the early post-war years, a monopoly of ascendancy in nuclear weapons the concept of operations in Europe was based on relatively small conventional forces acting as a "trip-wire" to precipitate massive nuclear response. However, as the USSR built up its nuclear capability the tripwire concept became less and less realistic.

By the early 1960s two major factors dominated the tactical scene. First, tactical nuclear weapons became available to NATO and operational plans were made on the assumption that early release for their use would be readily obtained, thus counterbalancing the growing imbalance in conventional forces between the Warsaw Pact and NATO. Second, West Germany's economic recovery gained momentum and the German Army began to play a major role in the defence of Western Europe. These factors led to the adoption of a "forward policy" based not as previously on a phased withdrawal to the Rhine, but (in the case of 1 British Corps) defence based on the River Weser some 150 kilometres from the East German border.

This policy led to a demand for rapid obstacle creation capabilities, in particular for the means of preparing extensive minefields, demolitions and craters for which mechanical minelaying and improved demolition stores had to be

developed. It was also necessary to provide an ability for a covering force to withdraw effectively while at the same time maintaining the mobility of a counter attack formation, for which rapidly emplaceable bridging and armoured engineer vehicles would be required together with an ability to breach our own and enemy minefields.

Throughout NATO, operational plans were to be set in motion by an elaborate system of warnings that would be originated from Supreme Allied Commander Europe (SACEUR)'s headquarters in various states of threat from the Warsaw Pact. They were designed to ensure that units would not deploy too early, and so give a pretext for a pre-emptive attack, but would have sufficient time to move from peace-time locations to operational areas, fully equipped to fight. This emergency deployment was regularly practised through a series of exercises initiated from SACEUR originally known as Quick Train and later as Active Edge.

It was essential for the Sappers to deploy before the main combat units in order to prepare the battle area by laying obstacles, digging-in formation headquarters and outloading field defence stores for collection by combat units as they deployed. It was assumed that these activities could be undertaken with minimum risk of provocation of the enemy but that as little as 48 hours might be available for the work. This called for precise and well practised plans known as the General Deployment Plan (GDP) involving complex moves from barracks, opening and manning stores, assembling of transport and siting of dumps in relation to tasks. Such plans were being continuously updated to cater for new operational concepts, new equipment and physical developments in the deployment areas.

The dispersion of combat units to counter the tactical nuclear threat meant that brigade areas of responsibility became enormous by World War Two standards and the affiliated field squadrons became impossibly stretched. By the early 1960s the corps engineer squadrons were increasingly placed under command of divisional CsRE and brigades. By 1969 the corps engineer regiments had disappeared as each brigade had its allocation of engineer effort doubled to two field squadrons in the form of a mini-regiment.

So although the deployment of 1 British Corps into the field was critical to the success of operations in the first phases of an

attack, success would depend on the additional plans for reinforcing the whole of BAOR from the UK base with both regular and TA units for which a handling and equipping organization existed which would be activated in a period of rising tension from the channel ports forward to the Corps area. Reinforcements included both combat troops destined for forward areas and all arms formations whose task was to establish conditions in which the Corps could be resupplied over sustained operations and to ensure the security of the Corps Rear Area and the Rear Combat Zone.

The TA engineer units involved were mostly provided by 30 Engineer Brigade, based in Stafford in peacetime. A few were allocated to reinforce units in the forward area but their contribution would inevitably be affected by equipment not well suited to the armoured battle and the training limitations of part time soldiers. A multitude of tasks was foreseen in the Corps Rear Area for the remainder, primarily the maintenance of the Main Supply Routes (MSRs) for which Heavy Girder Bridge (HGB) was stocked and specialist plant units provided, and assistance to the logistic units in the area, including the specialist team responsible for activating the NATO pipeline take-off points.

An interesting by-product of the changed tactical concept was the clamour it provoked by all arms for an inherent amphibious capability. This arose because it was apparent that if the battle group was to be able to move and fight as an independent entity it would need the ability to cross gaps and water obstacles without using bridges or rafts and without the need to concentrate at the obstacle. As a result a new range of amphibious vehicles was introduced and work was put in hand to develop a variety of aids to enable these vehicles to enter and leave rivers easily and to wade and swim where necessary; it also led to the setting up of numerous studies to determine future doctrine, in many of which Royal Engineer units and personnel took a leading part. Much of the theory was put to the test in an exhaustive trial, called Exercise Leander, carried out on the rivers Weser and Leine from 14 - 28 April 1966 by a battle group of 11 Infantry Brigade, with 1 Field Squadron in support, which was one of the few occasions when British tanks have "schnorkelled" since World War Two.

A continuing operational task in the Corps Rear Area was the support of the Harrier Force for which 10 Field Squadron, the

in-theatre unit responsible for this role, was to be reinforced from 38 Engineer Regiment based in Ripon. Another specialist task was the so called "works for war" programme for providing logistic facilities such as hospitals and workshops in the Corps Rear Area by modifying existing barrack accommodation. This work was preplanned in detail with the manpower and stores earmarked in peace to carry out the work should the need arise.

By 1968, with the build up of tactical nuclear weapons on both sides, came a recognition that massive nuclear response to the "trip wire" was no longer realistic. So NATO formally embraced the concept of Flexible Response in the hope that initial use of nuclear weapons could be delayed and confined to small tactical warheads, the size of warhead escalating if initial use did not bring hostilities to an end. This required a build up in conventional forces with an ability to deal with anything but a large-scale deliberate invasion, much of this build up being in the German Army. This build up, and a natural German desire not to have a tactical nuclear battle destroy their own homeland, drew the planned defence yet further eastwards, to the River Leine and beyond.

It would have appeared quite unrealistic in 1960 to conduct the main defensive battle so far forward but the advent of new radios, armoured personnel carriers, helicopters, wheeled plant, guided missiles (both artillery and anti-tank), amphibious bridging and a host of other advanced equipments in a period of twenty years radically transformed battlefield methods. Tactical concepts, however, on matters such as mobility and counter mobility remained as diverse within the Northern Army Group as the National forces of which it was comprised.

ORGANIZATION AND EQUIPMENT

1 British Corps Units

The many reorganizations of units and formations that took place between 1960 and 1980 cannot be understood in isolation from the almost continuous flow of new weapons and equipment emerging over the period which in turn led to a regular revision of battlefield tactics.

At formation level there were four major reorganizations affecting Royal Engineer field units over the twenty year period. At the outset, each brigade within the three divisions had its own organic field squadron under command; each division had its

own field park squadron and additional support was provided by two corps engineer regiments within an Engineer Group. In 1961 the brigade field squadrons reverted to the Divisional CsRE command though many remained dispersed in their brigade areas. By 1965 they had all been gathered together again as engineer regiments, the Divisional CsRE being the commanding officers.

A major change came about in 1969 when, by disbanding the Engineer Brigade, (as the Group had been renamed in 1964) and its corps engineer regiments, brigade support was doubled to a regiment of two field squadrons. At division the CRE became a full colonel commanding two regiments, an armoured engineer squadron and a field support squadron. A short lived experiment was tried in 1969 when, as an expedient to reduce the rising costs of keeping a large peacetime army on the continent of Europe, 6 Infantry Brigade was withdrawn and stationed (less its heavy equipment) in the United Kingdom, including 7 Field Squadron in support. The decision was reversed in 1970 and by March the following year the brigade had returned to Germany.

In 1976 a further major change, known as the "Restructure Plan", was under way in an attempt to reduce the manpower of the Army without impairing its effectiveness unduly. Under this plan, 1 British Corps consisted of four divisions and the brigade level of command was to disappear, though a small tactical Field Force HQ was soon introduced. Each division was to have an engineer regiment of three field squadrons and a field support squadron, the latter to include a tank bridge troop, the only armoured engineers remaining. But this reorganization proved to be equally short lived and in October 1980 the Army Board authorized the reintroduction with effect from 1 January 1981 of the title "Brigade" to replace "Field Force".

Field Engineers

If the individual sapper's, perhaps cynical perception of organization in a BAOR field squadron was one of continuous change he would indeed have been right. National Servicemen formed the bulk of the Army in 1960 and field squadrons had two officers per troop. But that year saw the last call up and over the next two years units had to adjust to an all regular establishment. As the national service officers left, and tribute must undoubtedly be paid to the excellent overall quality of

those who served in the Royal Engineers, troop sergeants were upgraded to staff sergeant and an extra sergeant was added to each troop.

Control of engineer troops over the enormously increased frontage was made possible by the advent of the Larkspur range of VHF wireless sets and mobility was enhanced by the replacement of the smaller crawler tractors with wheeled machines. The Light Wheeled Tractor, which came to squadrons in 1961, considerably speeded up a number of engineer tasks as it could be adapted for tasks as varied as launching bridging pontoons or as an elevating stand for fixing demolitions to the upper girders of bridges.

In the late 1960s the army was re-equipped with FV 432, the first British tracked armoured personnel carrier (APC), and this affected the Sappers no less than the infantry. The section was reduced in strength and maintenance effort was inevitably increased, but advantages were great both in mobility and in the ready availability of the APC as a power source for driving a whole new range of electric tools and as a tractor, for pulling the new bar-minelayer for example. The mobility now being achieved by such re-equipment together with the tactical demands of a battlefield likely to be dominated by enemy air superiority, at least in daylight, demanded parallel development of rapidly emplaceable bridging equipments, much of it for use by the armoured and amphibious engineers.

Armoured Engineers

26 Armoured Engineer Squadron, equipped with ancient Churchill Armoured Vehicles RE (AVREs), Arks, Flails, Bridgelayers and No 3 Tank Bridges had moved back to BAOR in September 1957. In 1963 the Squadron was equipped with the new No 6 Tank Bridge and two years later 2 Field Squadron was converted to 2 Armoured Engineer Squadron to join 26 Squadron in a reformed 32 Armoured Engineer Regiment, based at Hohne, as the new Centurion based equipment became available.

As part of the 1969 reorganization the role of 32 Armoured Engineer Regiment was changed and it became, as 32 Engineer Regiment, one of the new, smaller, two squadron regiments. The two armoured engineer squadrons were removed and a third (31 Squadron) was formed, and by 1971 these three squadrons

became virtually independent, each coming under command of a Divisional CRE, now a full colonel.

Deployment of the new 75 foot clear span No 8 Tank Bridge, mounted on the Chieftain Bridgelayer, began in 1974 to be followed in 1978 by the issue of the additional shorter 40 foot No 9 Tank Bridge. The "Restructure Plan" had envisaged the demise of the AVRE but in the event this never took place. Nonetheless in April 1978 2 Armoured Engineer Squadron was disbanded and 26 and 31 Armoured Engineer Squadrons amalgamated to form 26 Corps Armoured Engineer Squadron, based at Munsterlager and under direct command of HQ RE 1 British Corps. But the reduction to one Armoured Engineer Squadron did not meet the tactical demand and furthermore the new unit held so much equipment and armour that it became almost unmanageable. So in January 1980 31 Armoured Engineer Squadron was reformed, to join with 26 Squadron, a REME Workshops and an RHQ, a reconstituted 32 Armoured Engineer Regiment.

Amphibious Engineers

Amphibious bridging had been considered briefly during World War Two but the idea was not pursued. The concept was considered further however in the early 1960s and a requirement to build a Class 60 400 foot floating bridge in under an hour with a minimum of men was formulated, with an envisaged in service date of 1965. To meet this in service date it was necessary to consider equipments already in an advanced state of development and after extensive US and UK trials the French EWK-Gillois equipment was accepted for service in 1961. In May 1962, 1 Troop of 50 Field Squadron was reformed as 23 Amphibious River Crossing Cadre, equipped with seven Gillois units. The Cadre was expanded into 23 Amphibious Engineer Squadron in 1963 with Major J L Booth as its officer commanding.

By June 1962, however, enough information had come to hand to convince the Staff that a German alternative, the M2 Amphibious Bridging and Ferrying Equipment, was markedly superior to the Gillois and in July acceptance of the Gillois was withdrawn. By 1964 the newly formed Amphibious Squadron was training with M2 rigs borrowed from the German Army but it was not until 1969 that enough of the new rigs, incorporating the many improvements requested by the British and German

Armies and designated M2B were available to reorganize the Squadron into three troops, each holding eight rigs. By early 1970 more rigs had arrived and formation of a new regiment, 28 Amphibious Engineer Regiment was put in hand. The Regiment was based in Hameln and the first Commanding Officer was Lieut Colonel H J Goodson. Two additional squadrons, 64 and 73 Amphibious Engineer Squadrons, were formed, and in April 1971 the Corps Commander Lieut General Sir John Sharp took the salute at the Formation Parade. However, in 1976 73 Squadron lost its amphibious role and moved to Osnabrück.

Engineer Support

Engineer Support throughout the period was maintained by 65 Corps Field Park Squadron (later Support Squadron) together with the organization universally known to BAOR sappers as "Willich". This was a large engineer stores and workshops complex which had been set up in a rail served depot on a site west of the River Rhine soon after the end of World War Two. The complex, known as 40 Advanced Engineer Stores Depot controlled a number of sub depots, and in 1960 comprised 21 Workshop and Plant Squadron and 41 Plant Park Squadron at Willich, 46 Workshop and Park Squadron on the Dutch border, and a number of forward depots. The unit later became 40 Advanced Engineer Stores Regiment and then, in the late 1960s, 40 Army Support Regiment, with two squadrons in Willich, 21 and 41 Army Support Squadrons. These had identical wartime roles and establishments but differing peacetime roles, 21 being primarily a Plant Park Squadron and 41 a Workshop Squadron. 303 Stores Depot was also at Willich, with 305 Stores Depot at Hamm, and sub-depots at Sennelager, Hannover, Scharfoldendorf and Hameln. Subsequent reorganizations saw the disbandment of the Regiment although its support role west of the Rhine remained and was fulfilled by 21 Army Support Squadron in Willich. Responsibility for the more forward sub-depots was then taken over by 65 Corps Support Squadron based in Hameln.

The essential task of the support organization was to ensure that the necessary resources were available in the right place at the right time to permit the finely tuned plans referred to earlier in this chapter to be accomplished. Top priority went to the

mines and explosives required for the obstacle plan which, although they were stored by Ordnance and transported by RCT, were under Sapper control throughout as was the earthmoving plant required for digging. Electric light and power had also to be provided for headquarters and in the case of Corps Headquarters a special unit, the Corps Lighting Troop, existed for the purpose.

The responsibilities of the field support squadrons, 65 Corps Support Squadron and of the base unit at Willich varied over the period in keeping with operational plans but essentially these integral support units were able to deal with the requirements of the Corps forward area.

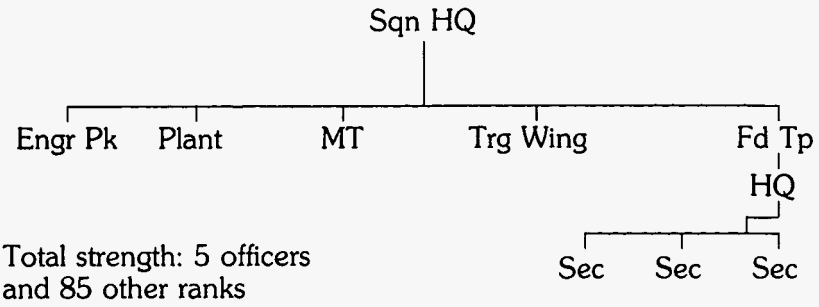
The Corps rear area and rear combat zone had further requirements in war and these were to be met by TA units principally 125 Field Support Squadron and 143 Plant Squadron each of which had pre-planned tasks but were also available as a reserve.

In this context a particular group of units existed, special to BAOR, known as Mobile Civilian Groups (MCGs). These units were formed shortly after the 1939-45 war to fulfil a wide range of logistic roles and at the same time to absorb and provide employment for some of the vast numbers of "displaced persons" mostly refugees from eastern Europe and the Soviet Union. Many of these men had come from influential walks of life and had had professional training but were prepared to accept relatively humble employment in a quasi-military unit as a means of building a new life in the West.

The units under Royal Engineer control were the artisan and plant groups (MCAG and MCPG) in general tasked directly by Engineer Branch HQ BAOR though two, 212 MCAG and 256 MCPG, came under control of the CCRE. In time of war these units were to be mobilized to provide an immediate source of skilled labour and equipment for support tasks throughout the area.

38 (Berlin) Field Squadron

The British garrison in Berlin remained throughout this period at about brigade strength with 38 (Berlin) Field Squadron providing the engineer support. For this role the squadron was on the following special organization:



The squadron took part throughout each year in a variety of exercises with the West German and American troops in adjacent sectors, and routine training with the British brigade. Each year there were two major ceremonial events: the Allied Forces Day Parade in May, for which the squadron prepared spectator stands prior to participating in the parade, and the Queens Birthday Parade in June at the Olympic Stadium in which the squadron was similarly involved. Every second year a major military tattoo was held for which the Royal Engineers were fully committed for at least two months.

An unusual task arose on 6 April 1966 when a Soviet Yak 28, a Firebar fighter plane, crashed into the Havel river in the British Sector. 38 Squadron played a prominent part in the recovery operation using wheeled cranes on Heavy Ferries. While the salvage was being carried out repeated demands were made, without success, by the Russian authorities to take over the work in order to prevent close examination of the remains of the plane by Western eyes. The handling by the squadron of this difficult task drew much favourable comment locally, the officer commanding, Major R M Hutton, was awarded the MBE and a member of the RE Diving Unit from Kiel earned the Commander-in-Chief's Commendation for his part in the operation.

Assistance was given to the local community when the circumstances permitted and tasks included the earthworks for a new sports centre at Folkenhageuer Field in 1970 and the construction of a border track and observation post at Eiskeller in 1972. Repairs were also made to a barracks roof extensively damaged during a storm later the same year.

Under the 1977 Restructure Plan the role of 38 Squadron remained unchanged though the parent formation became retitled Berlin Field Force until 31 December 1980.

Organization Trees
Organization trees showing the outline order of battle of RE units in Germany in 1960, 1970 and 1980 are at Figures 3, 4 and 5 at the end of this chapter.

TRAINING

The Training Cycle
The pattern of training during the year remained broadly similar throughout the sixties and seventies. Late autumn and winter months were spent on individual, trade and adventure training with unit exercises confined to skeleton and Command Post Exercises (CPX). During the spring and summer, troop and squadron training took place building up to a climax in the autumn when formation exercises, often with an international flavour, were held.

A major and essentially insoluble problem affecting training was the overstretch of officers and men in the field squadron, causing a significant restriction to the number of operational roles in which they were fully efficient. A study made in June 1966 showed that the conflicting demands of individual and collective training, and peacetime administration, were resulting in considerable turbulence and instability to both the individual and his unit. A soldier, if he were to have his annual entitlement of leave and undergo the minimum individual training required, was only available to his squadron commander for collective training, exercises or other work for some eighteen working weeks of the year. Furthermore the working strengths of squadrons, allowing for personnel on detachment, courses and leave, fluctuated considerably during each year; some squadrons had working strengths of 70 per cent in the summer months and were reduced to as low as 35 per cent in the winter. Although squadrons had, on average, nearly their full complement of officers, a significant proportion of their time was spent on duties outside their unit such as courses, brigade and regimental duties. As a result the programme of training was necessarily geared very closely to the unit's operational role and

the less essential field engineer tasks might only be practised every two or three years. RE units took low priority in the allocation of ranges and marksmanship suffered as a result, but the primary operational roles of minelaying, demolitions and bridging were regularly rehearsed on exercises and gallops over rivers, canals and country that became increasingly familiar to the longer serving soldiers.

Problems of Major Exercises

Despite the reduction in size of the Army with the end of National Service in 1962, the problems of mounting realistic training exercises grew. Convincing representation of nuclear conditions was extremely difficult to replicate and the increased mobility and mechanization offered by the introduction of the tracked Armoured Personnel Carrier led to increasing expense and requirements for maintenance and repair. Exercise realism was further reduced by the need to avoid excessive damage to crops and property by confining movement wherever possible to roads or uncultivated land. Nonetheless, major exercises continued and the engineer regiments found themselves engaged more and more in damage control.

As an example a major exercise Spearpoint was held in 1961. These were the biggest manoeuvres in Germany since the mid-1950s and the first full scale test since 1 British Corps had been reorganized on a battle group basis. The exercise involved 30,000 troops for six days and included considerable engineer activity for which reinforcements of two squadrons were sent from 36 Corps Engineer Regiment in England and one amphibious river crossing company from the United States Army in Germany. Initially 2 Division fought a defensive withdrawal against 1 Division, for which much engineer effort was expended on simulating road craters, minelaying and culvert and bridge destruction. Subsequently a counter-attack across the Weser and Aller rivers took place using Light Assault Floating Bridge, Heavy Ferry and the recently purchased Gillois amphibious equipment. Despite the weather being fine throughout the exercise, and the absence of the heavy Conqueror tanks from the armoured regiments, the damage caused was considerable and necessitated the use of two full Royal Engineer regiments for a week on post-exercise repairs.

Major exercises were regularly held in the early autumn after

the harvest had been gathered, sometimes between brigade groups, sometimes between divisions. It was not difficult to incorporate demolition plans and river crossings into these exercises, but extensive minelaying was seldom included for a number of reasons which will emerge from the paragraphs below.

Minelaying

Although the mechanical minelayer Mark III, an ingenious if somewhat cumbersome machine for laying Mark VII anti-tank mines, had considerably speeded up the laying process it was still relatively slow and required an immense logistical effort to sustain on any large scale. Vast numbers of concrete dummies were produced by the resources organization and the handling and recovery of these became the bane of the BAOR sappers' life. Ploughing across fields also caused considerable damage and a combination of these disadvantages made it an unpopular adjunct to a formation exercise which required sustained momentum for the infantry and armour.

The advent of the bar-mine, and a minelaying plough which was towed by the section APC, revolutionized the speed of laying. Dummy bar-mines, just made of a length of wood to the correct dimensions, could be produced cheaply and in quantity. But still the sappers' immense and tedious task of clearing up after exercises had to include recovery of all dummy mines and this led later to the development of a version made of peat filled cardboard which could be left to rot in the ground and was normally acceptable to German farmers.

But while operational plans demanded the laying of immense minefields the practical exercise problems of field and crop damage precluded much opportunity for practice. Concerned that neither a large scale bar-mine laying operation nor its concomitant logistic supply system had yet been put to trial, in 1973 CRE 1 Division (Colonel W J Reed) offered to write the Divisional CPX around a full scale engineer minelaying exercise. CCRE 1 (BR) Corps (Brigadier C B Pollard) though doubtful initially that the necessary exercise rights would ever be negotiated promised all necessary logistic support including the manufacture of thirty thousand dummy bar-mines.

The CRE felt that by siting minefield strips down the edges of fields alongside the numerous farm tracks that patterned the

arable land of Niedersachsen, the re-supply of the bar-minelaying operation would be simplified, the strips were likely to be better camouflaged along the natural cultivation lines and damage could be reduced to an absolute minimum. On helicopter reconnaissances he personally sited the mine strips and, together with the Services Liaison Officer, took the plans for discussion with the local German authorities and farmers representatives at a series of meetings in the relevant districts. The nearer the East German border they went the more conscious of the threat were the local population and after very amicable negotiations over certain out-of-bounds areas the necessary exercise rights were obtained. Although the pre-siting of minefields for exercise purposes did not always coincide with brigade commanders' tactical wishes when it came to the CPX, 25,000 mines were laid by the Divisional Engineers in about seventeen hours, proving both the reliability of the bar-minelaying system and the ability of the supply system to compete with the speed of laying. Furthermore, neither Brigade Commander could spot more than a fraction of the minefields laid in his area, nor was it easy for RAF reconnaissance pilots to recognise the APC and minelayer when it merged so well into the farming pattern. On this occasion at least the viability of the minewarfare plans on which so much of the defensive battle depended was amply demonstrated.

Bridging

Like a spine down the middle of 1 British Corps area of Germany flowed the River Weser, a substantial waterway liberally provided with ferry sites from Hoya (Verden) in the north to Holzminden in the south. It was ideal for bridging gallops which had become a regular feature of regimental training.

In 1960 units were still training with the Bailey Bridge derivatives for dry gaps, soon to be replaced by the Medium Girder Bridge, though the Heavy and Light Assault Floating Bridges (HAFB and LAFB) had been introduced for wet gaps and the Heavy Ferry was still in use. These latter equipments were relatively quick to build and bridging gallops typically took the form of squadrons and troops leapfrogging down the ferry sites of the Weser building a variety of ferries and bridges in succession.

The operational contribution made by HAFB and LAFB to wet

bridging was however very short lived as many of their roles were soon assumed by the amphibious equipment introduced soon after them, which reduced bridging and ferrying times dramatically. So bridging gallops on the scale of those usual in the 1950s and 60s ceased as together the speed of construction of the M2B and MGB brought them within the timescale required for the (somewhat unrealistically) short formation exercises then taking place.

Demolitions

Developments in the demolition field had been less dramatic than in bridging and minewarfare. The preparation of a bridge for demolition still involved quantities of guncotton slabs, plastic explosives and a festoon of detonating cord. To speed up preparation Rapid Demolition Devices (RDD) were developed, necklaces of shaped cutting charges for girder bridges and palletized crates of slab explosive for pressure charges. Frequent practice of this primary operational role took the form of demolition exercises chiefly on the dozens of bridges over the River Weser and the Mittellandkanal. Argument periodically arose over whether or not units should train on their actual wartime task bridges but with over a hundred sapper sections each exercising on about ten bridges every year there was little danger of any intelligent deduction by the enemy of engineer plans. Any such danger was more than offset by the advantages gained by the troops' familiarity with their operational sites.

The complexity of the demolition plans, the huge logistic effort they entailed and the inflexibility they created in overall operational tactics led to planning for the use of Atomic Demolition Munitions (ADMs) as a substitute for conventional devices. Under RE control a number of ADM teams were provided by the US Army Engineers and took part in some major exercises. However, although relatively small yield weapons were developed which would have been invaluable from an engineer point of view, the political implications of an early resort to the nuclear option effectively ruled out ADMs as a credible element in obstacle plans.

Because demolitions played such a key part in any operational obstacle plan, agreements were made with the German authorities for the building of pre-prepared demolition chambers in both bridges and roads in the operational area into which the charges, carefully designated in depots, could be emplaced

without time consuming work with boreholes in bridges and camouflets in roads. Back in the 1950s, some years before West Germany became a member of NATO, an operational demolition plan had been prepared for a wide scale cratering of road bottlenecks and hundreds of circular concrete chambers had been placed in roads. Road blocks of guncotton, commonly known as "cheeses", had been specially manufactured as had dummy cheeses for training purposes. As time went on the concrete chamber covers were dressed in layers of tar and chippings and one of the puzzles facing troop commanders on exercises was to find them.

As Germany became integrated into NATO the planning and construction of these chambers, together with other peacetime preparatory work, became the responsibility of the German Territorial organization known as the GTNC with its regional groupings of Wehrbereichskommando (WBK) and Verteidingungsbereichskommando (VBK). Manned by part-time soldiers but with a permanent command and administrative structure this force would be available in time of war to the formation in whose operational area they were located and a system of liaison developed under which the sappers concerned could be guided to and where necessary provided with access to the prepared demolition material.

Difficulties arose as operational plans changed and the chambers in roads had to be resited, a process which took some time. As a result a map of the area showing the location of these chambers gradually became covered with so many dots that the original nickname of "measle-shafts" remained particularly apt.

Training in Canada

With the advent of APCs, new tanks and anti-tank weapons of ever increasing range in the German as well as the British Army, the pressures on the available training areas in Germany soon became unsustainable. As a result of an agreement signed in August 1971 between the British and Canadian Governments, training started in 1973 for British Army units at the Suffield Training Area, Alberta. The area consisted of approximately 1,000 square miles of undulating prairie with severe cold conditions prevailing in winter and near desert conditions in summer. A permanent local British Army staff was established known as the British Army Training Unit Suffield (BATUS).

The area made possible live firing of all conventional battle

group weapons and provided an opportunity for battle groups to train from BAOR for periods of approximately one month in rotation throughout the summer. Royal Engineer representation was included and each Battle Group was supported throughout its training by a sapper troop. Exercises normally included an advance, using an AVLB, a withdrawal, including preparation of a reserved demolition, and a counter attack through a minefield involving a breach using the Giant Viper, an equipment which could not be detonated on the restricted ranges in Germany.

PROJECTS

By the end of National Service the regular sappers in field squadrons all had a second trade besides that of, predominantly, field engineer. But they had little opportunity to practise this second trade because training concentrated on the main operational tasks. As construction projects tended to interfere with this training, they were not universally popular with squadron and regimental commanders but had intermittently been undertaken. For example, considerable improvements were made to the Hameln bridging hards by 2 Division Engineers in 1962, but though good training these were generally relatively small projects.

In 1967 a deliberate effort was made to increase the scale of projects undertaken in order to improve the standard of project management and trade training of units in 1 British Corps, particularly in plant skills. As a result a number of works were carried out; major examples of which are described here. At the same time a Defence Council Instruction 178/67 was published laying down the procedures to be adopted when such work was undertaken by the Army on behalf of Civil Authorities.

Greven Airfield

The Greven Airfield task was the largest project undertaken by the Corps in West Germany over this period and was a major, and at times daunting commitment for several units during 1968 and 1969. It began with an unhappy start due in part, perhaps, to over-enthusiasm to get the project under way leading to bitter controversy over what might be involved. But nevertheless it was completed on time.

In mid 1967 the German authorities approached the British Army to see whether assistance could be made available in

building an airfield to serve the Münster-Osnabrück-Reine area. An airstrip existed at Greven but the site, which was otherwise heavily wooded, included one badly drained and swampy area and was within a few hundred metres of an aqueduct on the Dortmund-Ems Canal which had been repeatedly bombed during World War Two and where the presence of unexploded bombs was suspected. By March 1968 agreement had been reached with the Münster-Osnabrück Flughagen Gmbh, through Landkreis Münster, that the British Army would clear and level an area 2120 metres long between 400 and 500 metres wide, and produce a base of clean sand 1520 metres long and 50 metres wide, for a runway to be used by aircraft of Trident and BAC 111 size. In the event this necessitated an extensive earthmoving task amounting in total to some half a million cubic metres of soil.

Work began in earnest in April 1968. Overall responsibility for the Royal Engineer element of the project rested with CRE 2 Division (Lieut Colonel B S Read); 16 Field Squadron (initially Major D A Richards, subsequently Major R B Hill) provided the project control office; and units from all over BAOR (but particularly 43 Field Support Squadron) provided manpower and plant, amounting to about 100 machines in all. There were a number of constraints. Not all the land was acquired until some time after the project had started; the existing airstrip was to remain in use; a major change in the amount of slope in one area had to be accommodated in order to meet internal air traffic regulations; and as the project proceeded the project team found that they had to design certain aspects themselves because of sketchy initial planning. Despite many problems the project was nonetheless completed on 30 June 1969, within a few days of the planned date.

Many lessons were learned as a result of this ambitious effort, not the least being the fearful penalties incurred when major tasks are undertaken without adequate initial reconnaissance, planning and coordination between all concerned; omissions which in this case were responsible for the loss of his command by a senior officer in the Corps. Technically, however, the project was full of interest and incorporated many novel features including the need for a new method of working out mass haul calculations (because of the breadth of the site), the use of sand as a base as recommended locally and the infilling, rather than draining, of a swamp.

One useful by-product of the Greven project was a trial to establish the effectiveness of German forests as obstacles to tanks. It was not often that a mature forest became available in this way and full opportunity was taken to drive tanks through it before clearing the area for the runway. As a result of the trial a useful formula was derived to assist with operational planning.

Bracht Ammunition Depot

During World War Two, the Germans constructed an ammunition depot at Bracht using Elephant Shelters to provide storage, supplemented by locally designed sheds. In 1948 the Royal Engineers extended the depot but by 1970 the facilities were proving inadequate. As a temporary measure five Marston sheds were added during the summer of that year by 1 and 16 Squadrons while long term plans were drawn up by 522 STRE (Construction) for a significant expansion to include some forty Marston and Romney buildings. By December 1971 work was progressing well, the bulk of the effort being provided by 255 MCPG, elements of 217 and 232 MCAG and two sections of the Royal Pioneer Corps. Construction included roads, hardstandings, railway platforms and the laying of concrete floors and access for the new stores sheds. During 1972 a variety of units and subunits contributed to the work, including surveyors and plant operators from 1 British Corps, 39 Engineer Regiment (Airfields), and 117 Field Support Squadron (Volunteers).

The project was eventually completed on 22 Sep 1975 and consisted of twenty 200 foot Marstons, twenty kilometres of road, 35,000 square metres of paved hardstandings, 1,000,000 cubic metres of protective sand traverses, four railway platforms and 22 kilometres of new water mains.

The Royal Silver Jubilee Parade 7 July 1977

The main contribution by the Army to the Royal Jubilee Celebrations in 1977 was a review by Her Majesty the Queen at Sennelager on 7 July, culminating in a drive past by the whole of 4 Division. The area selected for the review was the Windmill site on Sennelager Training Area, last used for a Royal Review in 1956.

Royal Engineer assistance was called upon for the preparation of a review area with a surface of sufficient robustness for an armoured division to drive past four abreast, the construction of

seating for 25,000 spectators, lunching, toilet and car parking facilities and a Royal "Walkabout" area. The first planning meeting was held in December 1975 and work started early the following year.

Severe constraints were imposed because of the extensive Explosive Ordnance Disposal (EOD) clearance required before work could start, as the site had been a range impact area for over a hundred years. As the range was in regular use, work could only take place whilst there was no firing in progress which effectively meant during range maintenance periods, weekends and public holidays only. Work started on site on 23 April 1976 with the deployment of EOD teams provided by all arms and supervised by a management team from 33 Engineer Regiment (EOD). At the same time, surveyors from 14 Field Survey Squadron started setting out the works sites, the quarry opened and stockpiling of material began. Plant was deployed on the site during the weekend on 30 April 1976 with operators drawn from all units in BAOR and placed under the overall command of 44 Field Support Squadron. This was the pattern for each subsequent weekend until the Phase 1 programme of earthworks was completed on 17 July 1976 when access was given to PSA for the ground to be seeded. Eighty-two assorted vehicles, items of engineer construction plant and motorized equipments were used and some 150,000 cubic metres of topsoil, sand and stone were moved in this phase.

In September 1976 a one week closure of the range was authorized so that a reinforced concrete tank turning pad could be laid down at the junction of the review area and the drive-past route. This was constructed to a PSA specification by 37 Field Squadron supported by elements of 44 Field Support Squadron and further work on the drive past route was carried out by 45 Field Support Squadron during weekends in November and December.

The second phase started in March 1977. The major part of the site construction was carried out by 5 and 25 Field Squadrons of 26 Engineer Regiment, with plant support provided by the plant troop of 44 Field Support Squadron, and resources support by the stores troop (Rear) of 65 Corps Support Squadron who were conveniently based at Sennelager. The project was supported by almost every engineer support unit in Germany, and units of other arms from 2 Armoured Division assisted with labour on site. Sennelager Park of 65

Corps Support Squadron backed by 303 and 305 (Army) Engineer Parks and Command Pool of Training Stores, worked unceasingly to meet every demand and earned the unstinting praise of everyone involved in the project. A total of 1300 tons of engineer stores were handled by the park and incorporated into the project. Press towers, Braithwaite tanks and Class 30 trackway roads throughout the tented areas were completed. 242 rolls of Class 30 trackway and 30 rolls of Class 60 trackway, to cover a length of 7.9 kilometres were laid by the end of the project - surely the longest stretch of trackway laid since World War Two. Other tasks included an Extra Wide Bailey Bridge tower for control purposes, the bases for some 400 flagpoles, stands for 640 VIPs and for 1680 less important persons. The bench seating for some 25,000 spectators was made with Bailey chesses of 9 x 3 inch timber covered in polythene, and eighteen blocks of toilets were constructed.

Top priority at the start of the final construction period was the EOD clearance of critical areas of the site, including the car parks and the route to be taken by Her Majesty. This work was done by a troop from 73 Independent Field Squadron supervised by a team from 33 Engineer Regiment (EOD), and as soon as the Royal Enclosure was cleared, 40 Army Support Regiment came in to erect the Royal Box. This magnificent structure had been prefabricated in the Regiment's Workshops in Willich and was originally painted in a hideous mottled pink and turquoise combination specified by a colour consultant but was later mercifully amended to a more reasonable colour on the order of the Commander-in-Chief.

The day itself was a resounding success. The weather was perfect and the weeks of preparation and practice proved themselves to have been well spent. 25,000 people saw 4 Armoured Division drive onto parade in perfect formation thanks to the accurate surveying of the vehicle pegs and, after the pomp of the March-On of the Regimental Colours and the massed bands of 800 musicians came the arrival of Her Majesty The Queen. Once her inspection of the Division, carried out in the Range Rover which drove over the specially prepared route, had been completed came the moment for the drive off parade and onto the runway for the drive-past. It was a magnificent spectacle as row after row of 600 armoured vehicles of varying types swept down the runway from the concrete pad on which they had all turned from the parade ground, while overhead the

Division's helicopters flew past. The engineer contingent made a most impressive sight, providing the widest variety of equipment on parade. Led by the commanding officer of 35 Engineer Regiment (Lieut Colonel F G Bevan) in his APC, it included AVLBs, M2 Rigs, Ranger anti-personnel mine launchers mounted on APCs pulling Barminelayers, as well as a contingent of plant headed by OC 44 Field Support Squadron in a Combat Engineer Tractor.

"Almost miraculous" was the description used by reporters subsequently when, in the hour after the end of the drive past and before Her Majesty reappeared from lunch, the displays were set up in the area where the bands had paraded earlier. Unfortunately the Queen's visit was curtailed so that she only had three minutes with the Sappers. However, she did manage a visit to the Postal Display where she was presented with a First Day Commemorative Cover which had been signed by the Chief of the General Staff, General Sir Roland Gibbs, The Commander 1 British Corps, Lieut General Sir Richard Worsley and the Parade Commander Major General Nigel Bagnall.

When it was all over 5 Field Squadron, supported by 100 infantrymen and fleets of Royal Corps of Transport 10 tonners, dismantled and cleared the site within a week, and cleaned and handed in the stores a week later. Peace returned to Sennelager and only the resources organization was left to clear the account and return the stores to their rightful owners.

OUT OF THEATRE DEPLOYMENTS

The Skopje Earthquake

On only one occasion during this period was the British Army of the Rhine called upon to provide assistance to a European country outside NATO. The event was an earthquake in Skopje in Yugoslavia in 1963 and although few Sappers were actually involved their participation was significant for the reputation of Britain and the Royal Engineers elsewhere in Europe.

Skopje, capital of the Yugoslav Republic of Macedonia, was almost completely destroyed during the early hours of Friday 26 July 1963 by a violent earthquake, the worst in the country's history. Three violent shocks at 0500 hours laid four-fifths of the City in ruins, killed over 1000 people, injured many thousands

and rendered homeless almost the entire population of over 170,000. All the city's main buildings were completely destroyed, including the City Hall and the railway station, the Hotel Macedonia (the largest in the city), the National Bank and the Ethnological Museum, as wells as clubs, banks, churches and mosques. Not only were modern housing estates, built since the end of the War, nearly all in ruins, but also the ancient Turkish quarter, the Kursumli Khan, built in the 16th century.

Large scale aid was immediately provided by many countries. The British Government announced that it was sending twenty-four Nissen huts with a small party of Royal Engineers to supervise their erection. The provision of this party fell to Headquarters 11 Engineer Group in BAOR whose two regiments were widely dispersed, 25 Corps Engineer Regiment being at its Bridging Camp at Hameln whilst 35 Corps Engineer Regiment was deployed on various engineering tasks in Germany. The RE detachment consisting of an officer, Lieutenant C G B Brodley, a senior NCO and five sappers was despatched by train from Dortmund on the morning of Wednesday 7 August. The 36 hour journey from Dortmund to Belgrade was not without its associated problems as this was the first occasion that British troops had served in Yugoslavia in peacetime, their route was to take them through neutral Austria, and the move was to take place over the August Bank Holiday.

The Engineer Task

Not surprisingly both the Ambassador and the Military Attaché were on leave when the officer commanding the RE detachment reached Belgrade, so he was briefed by the Chargé d'Affaires. He was ordered to build a sufficient number of huts to give the Yugoslav engineers and workmen enough experience for them to be able to complete the project on their own and then to hand the work over to them at the earliest possible moment. The assumption was made that the huts would be used as very temporary accommodation on a single camp site and could therefore be built on timber sleepers or an equivalent rapid foundation.

Within an hour of arriving at Skopje a meeting was held with the Planning Directorate. The 24 foot Nissen huts, with their uninterrupted floor space of 147 square metres, although too large for private accommodation were ideally suited for communal buildings and it was agreed to use them as schools.

On 11 August the site was set out and that afternoon the first consignment of stores arrived from the UK. As work progressed it became increasingly evident that the detachment would not return to Germany by 23 August as had originally been planned because, to be used as schools, the huts would be given a planned life of up to fifteen years and would therefore require concrete foundations, and the cavity between the inner and outer linings was to be packed with fibre glass as insulation. Also, instead of one site there were to be three at considerable distances apart; and instead of the promised abundance of engineers and interpreters, there was a scarcity of both.

On 13 August the British Embassy requested that the RE detachment should remain in Yugoslavia to deal with the handling of an additional 29 Nissen huts which were expected to reach Skopje on 14 September. Furthermore "War on Want", who were providing an additional 160 16 foot Nissens and 40 24 foot Nissens, asked the War Office for more Sapper assistance. Accordingly an additional field troop with attached senior NCOs was provided, mainly from 42 Field Squadron. This gave an organization of two seniors, two corporals and twelve tradesmen, with at HQ an administrative officer, a works officer, a clerk of works, and a stores sergeant.

The reinforcement party under the command of Captain S L Rooth, arrived on 27 September, followed by a consignment of 150 Nissen huts during the weekend. A severe shortage of transport and handling equipment resulted in every item of the 1,013 tons of stores received having to be unloaded by hand. At the Skopje railhead, as late as November, there were no cranes so bundles had to be split and the sheets unloaded a few at a time. A similar situation prevailed on the sites where there was often not even a spare lorry to assist in the movement of stores.

On 1 November the final assignment of stores arrived, including forty 24 foot Nissen huts, water tanks and towers, and the water supply fittings for the camps. When these stores had been moved to the sites and sorted the major tasks of the Sappers were done. By then local labour was capable of erecting the huts without technical supervision, but with varying standards of workmanship. The final task was the erection of the water supply system, including tanks and towers, and eventually all work was concluded on 28 November 1963 when the camps were handed over to the Yugoslavs for completion.

Aden

In 1966, for the first time, units were posted from BAOR to the Middle East for emergency tours; hitherto such support had always been provided by units based in the United Kingdom. In September, 30 Field Squadron moved from BAOR to Aden on a six month emergency tour, to be relieved in March 1967 by 39 Field Squadron. The squadrons were employed on road construction and maintenance from Aden to Habilayn and the Radfan, and their deployment showed that it was possible, given even a short period of preparatory training, for units to switch roles from combat engineering to construction projects and from the make-believe atmosphere of peace time training to the hostile environment of an active service theatre. A fuller account of their work is given in Chapter VII of this volume.

Northern Ireland

By 1971 the demands of the emergency in Northern Ireland had been putting severe strains on the infantry for some years and the Royal Engineers were now asked to send engineer regiments to the Province in the infantry role. 21 Engineer Regiment (Lieut Colonel A C S Ross) was the first to be selected reinforced with 5 Field Squadron from 26 Engineer Regiment and 42 Field Squadron from 35 Engineer Regiment. After a period of special training in BAOR they moved to Long Kesh with squadrons based there, in Newry, Gosford Castle and Lurgan. They were followed by a succession of engineer regiments undertaking four month tours in the infantry role and these continued until 1979. While these tours undoubtedly affected the standards of combat engineering proficiency in the regiments, the experience gained in other fields particularly by the junior NCOs, was without doubt extremely valuable.

GUESTS OF AN ALLY

Changing Relationships with the German Nation

The longer the British Army of the Rhine remained in Germany the more it was both right and inevitable that local relationships should change. To the many officers and senior NCOs who returned at intervals over a number of years the change in attitudes between the two nations who had so recently been enemies was remarkable. In 1950 the British were an army of occupation and those who had fought through the European

campaigns were horrified at the prospect even of having to obey German traffic laws. By 1960 Germany was a member of NATO and a relationship of mutual tolerance and arms length cooperation prevailed. By 1970 friendship was genuine and the British were truly and consciously guests of an ally. "Host nation" support both in peace and war was in any case vital to BAOR's existence.

Exercise Backlash

When Germany became a member of NATO it assumed responsibility, as the host nation, for the main supply routes (MSRs) forward to 1 British Corps; and the maintenance of these routes was a task of 705 (GE) Construction Regiment, a Reserve unit of the German Army. In May 1962 an exercise was planned to test the capacity of ferries across the Rivers Maas and Rhine for two west-east MSRs should the bridges be destroyed. The Royal Engineers were asked to send a squadron to operate three heavy ferries alongside the German engineer battalion's landing craft. The officer commanding 2 Field Squadron (Major W J Reed) accepted with enthusiasm the opportunity to take part in this interesting and unusual commitment.

It was planned to operate two ferries at Wesel and one at Orsoy and Major Reed also reconnoitred the site at Xanten, although he was assured that this would not be used. As the change from National Service to all regular soldiers had been taking place, few of the troops had experience of heavy ferries so the squadron moved to the Rhine for four days intensive training before the exercise. On arrival at Wesel the officer commanding found that the water level had risen by two metres since his reconnaissance so the ferry building sites were moved to Büderich and both banks of the river at Orsoy.

As most of the other nation's participants in the exercise were Reservists it took place over the weekend of 26/27 May and the Rhine was closed to river traffic from 1300 hours on Saturday to 1000 hours on Sunday.

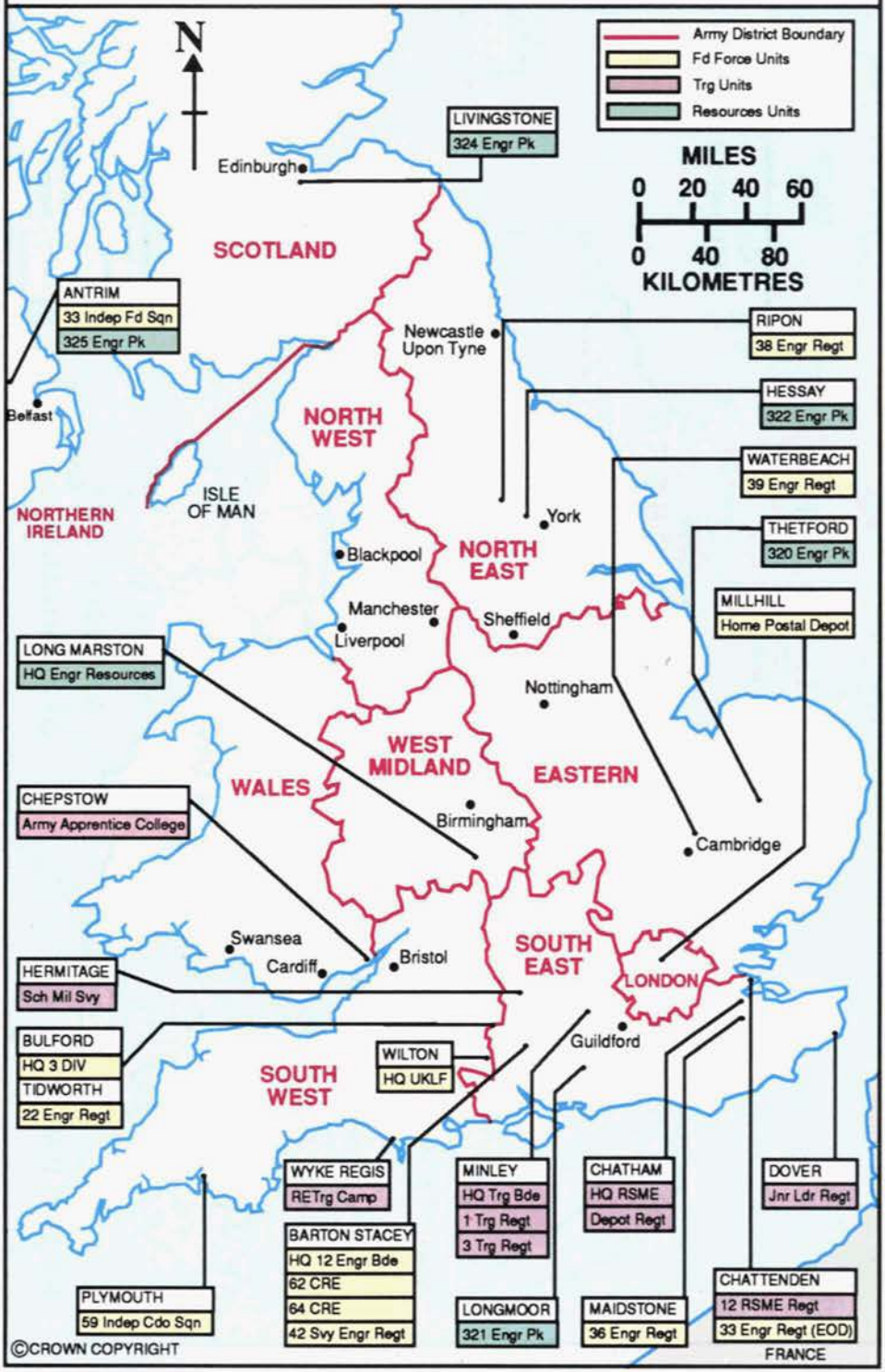
An almost continous stream of German, Dutch and British military traffic was ferried across the river at Orsoy by a combination of two heavy ferries and two German landing crafts while the third heavy ferry was held in reserve at Büderich. At 2300 hours on 26 May it was ordered to move to Xanten where it was in operation by 0250 hours.

As 1000 hours approached on the Sunday morning the build

BAOR DEPLOYMENT 1972
MAP 1
N
MILES
0 50 100
0 50 100 150
KILOMETRES
KIEL
1 DIV
Cuxhaven
HAMBURG
Elbe
Wilhelmsburg
NIEDERSACHSEN
BREMEN
Soltau
Munster Lager
Verden
Fallingbostel
Hohne
Aller
Weser
Ems
2 DIV
BERLIN
BIELEFELD
HQ 1(BR) CORPS
Nienburg
Mittelland
HANNOVER
Osnabrück
Lübbecke
NETHERLANDS
Rheine
Herford
Hameln
Greven
Münster
Scharfoldendorf
Sennelager
Holzminden
Leine
Rhein
Ems
Dortmund Ems
Hamm
Paderborn
Soest
Wesel
Xanten
Maas
ESSEN
Orsoy
Laarbruch
DORTMUND
Mündelheim
Ratingen
Willich
Brachl
DÜSSELDORF
Kassel
Mönchengladbach
4 DIV
SOVIET
OCCUPIED
ZONE OF
GERMANY
KÖLN
2 DIV
FEDERAL
REPUBLIC
OF GERMANY
RHEINDAHLEN
HQ BAOR
BONN
Rhein
BELGIUM
Inner German Boundaries
International Boundaries
Peacetime Divisional Boundaries
Autobahns
Canals

REGULAR RE UNIT LOCATIONS IN THE UK 1975

MAP 2



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up of commercial river traffic was massive at both ends of the closed section and under pressure from the river authorities the river was declared open twenty minutes early. 1 Troop commander was half way across on his final trip as, witnessed by an apprehensive squadron commander from the bank, a phalanx of Rhine barges bore down upon him. Disaster was avoided and a highly successful joint operation was concluded.

2 Field Squadron thus became the first British unit to serve under the direct command of a German since the Battle of Leipzig, known as the Battle of the Nations, in 1812. Besides being excellent training - seldom did a squadron have an opportunity to ferry four hundred vehicles across a river of the magnitude of the Rhine - it illustrated the ease of cooperation which now existed between the British and the new German army, staffed in the more senior ranks by highly experienced and professional soldiers who had served during World War Two.

On this exercise 2 Field Squadron was given the support of two Skeeter helicopters, on loan to 2 Division Engineers from the United Kingdom for integration trials. The first of the reconnaisance helicopters in the Army Air Corps their payload was limited to one passenger[1] but they revolutionized the exercise of command for the squadron commander over a broad frontage by enabling him to keep in close touch with each troop ferrying site and by giving him an ability to reach crisis points far more quickly than he could have done by road.

Hamburg Floods 1962

Periodically, troops in Germany were called upon to provide assistance to the civilian authorities in times of emergency, such as the floods that occured in 1962 and 1966.

On the night of 16 February 1962, following several days of north-easterly gales all along the coast from Cuxhaven to Hamburg, the sea broke through the defences and swept inland over the farmland and into the suburbs of Hamburg and Wilhelmsburg. On the morning of Saturday, 17 February, the local German authorities appealed to the army for help and at 1100 hours 1 Field Squadron set off with all the boats that they could muster in Nienburg followed, a little later, by 4 Field Squadron with more boats and engines from Hameln. Headquarters were established in a police station at Hamburg and by dusk that evening the first assault boats had been launched and rescue operations began. Tippers and assault

boats were also provided by 26 Transport Column Royal Army Service Corps. On arrival at Hamburg the troops worked continuously during the night and on Sunday morning to rescue 2,000 people from the floods. Royal Engineers and other parties joined with 710 German Pioneer Battalion in repairing dykes and roads damaged by the floods, shifting 6,000 tons of hardcore and sand in the process. Other troops of 1 Division in addition to evacuating refugees also helped in clearing the dock area, in emergency repairs to drains and roads, in the provision of sandbags and bedding, as well as manning the Kirchdop ferry.

Throughout the operation the weather was bitterly cold with a very strong wind and frequent falls of snow. The thinning out of British Army assistance started on Sunday 25 February and the emergency work was completed by Wednesday 28 February. By then Hamburg was free from the danger of further flooding although much remained to be done to repair the damage.

Hameln Floods 1966

In similar vein units of 11 Engineer Brigade including 42 Field Squadron gave assistance to local civilians following sudden flooding in Hameln in July 1966. In addition to the immediate rescuing of marooned civilians, the troops built three road bridges and one foot bridge to replace those rendered impassable with a speed which was much appreciated by the local population.

Exercise Rough Ramble

An enterprising departure from the normal pattern of training was undertaken by 32 Engineer Regiment in 1973 when the unit marched the 350 miles from Bedburg, near Cologne, to Donauworth to retrace Marlborough's forced march made 270 years before to the Danube, culminating in the battles of the Schellenberg and Blenheim. The march was planned as an opportunity for the regiment to carry out training as an entity, which recently the demands of Northern Ireland had not allowed, to act as a break from day to day routine and to have sufficient originality to provide a highlight to the year. The first 220 miles were covered by a volunteer composite troop who set out on 23 May and met up two weeks later, at Mündelsheim on the Neckar, with the remainder of the regiment.

Thereafter the whole unit marched every day until mid-morning, in ceremonial dress with their Corps of Drums when

the size of the town or village warranted it but otherwise in working dress, leaving the afternoon and evenings free for social and sporting activities. When appropriate a "Freedom Ceremony" took place in the town at which the Commanding Officer (Lieut Colonel P R T Driscoll), mounted on his horse Drummer, in his best German and in a carefully rehearsed speech asked the Bürgermeister for permission to march through his Stadt with drums beating and bayonets fixed. The Trooping by the Drums ended, the march was resumed, until on 23 June the regiment entered the town of Donauworth in style and the re-enactment was complete.

Freedom of Hameln

The granting of a more formal "Freedom" upon the Corps epitomized the totally changed relationships between the British and Germans that had taken place over the thirty years since the end of World War Two.

Hameln, of Pied Piper fame, was perhaps more famous in sapper eyes as the home of the RE Bridging Camp and many bridging training sites - with such well known names as Upnor, Wouldham and Gundulph. Many illustrious Royal Engineer units had been stationed in Hameln since 1946 including 42 Assault Regiment and 9 Parachute Squadron with the formation there of 23 Engineer Regiment in 1948, the first Field Engineer Regiment to be formed in BAOR, followed by 21 and 26 Engineer Regiments and latterly 28 Amphibious Engineer Regiment. The town had not been severely damaged during the war and the Corps had enjoyed some thirty years unbroken friendship with the Stadt and its citizens.

It was in recognition of this long association that the Stadt authorities wished to grant the Royal Engineers the freedom of their town on 3 June 1977, the first occasion that such an honour had been conferred on any British Corps as a corporate body. The British garrison had simultaneously selected this day to celebrate Her Majesty The Queen's Silver Jubilee. The celebrations were therefore combined into a joint band display and freedom parade in the Bürgergarten followed by a Troop of the town, a Jubilee Reception in the Officers Mess 28 Amphibious Engineer Regiment and an official Freedom Day Luncheon arranged by the Stadt. Finally, it was planned to end the day with a garrison all ranks Jubilee Ball arranged by 35 Engineer Regiment.

The Corps was represented on parade by ten Guards, each of three officers and 37 men from 73 Independent Field Squadron, representing 2 Armoured Division Engineer Regiment from Osnabrück; 21 Engineer Regiment from Hohne; 74 Engineer Regiment (Volunteers) from Northern Ireland and the host Hameln units of 28 Amphibious Engineer Regiment, 35 Engineer Regiment and 65 Corps Support Squadron. The Royal Engineer Band (Aldershot) and the Pipes and Drums of 74 Engineer Regiment (Volunteers) provided the Band Display and took part in the Parade and the Troop through the Town. In all some 530 officers and men took part in the ceremonies.

The representive unit detachments converged on Hameln on the morning of Tuesday 31 May for an intensive two days training. Rehearsals were complicated since the parade itself was due to take place on the hallowed lawns of the Stadt Bürgergarten, but permission could not be obtained to use this venue for the rehearsals. Practices therefore were held on the garrison cricket ground and included one separate wet weather rehearsal in Gordon Barracks and a practice Troop through the Town. Fortunately the weather was kind and enabled the full rehearsal programme to be completed.

Despite assurances of a clear, fine day by the Meteorological Office, those participating awoke on 3 June to a dark, overcast sky and fine drizzle. However the rain was not sufficiently heavy to cancel the fine weather programme and by 1030 hours the Bürgergarten was beginning to fill with spectators. At 1100 hours the Corps Band and Pipes and Drums began their display in front of the VIP guests and over 3000 spectators. The bands, resplendent in their dress uniforms and Macdonald of the Isles tartan, ended their display with an arrangement of "Wings". The ten representative regimental Guards then marched on and formed up around three sides of the Bürgergarten, with the bands in the centre. The Union Jack was raised for the Royal Salute and this was followed by a General Salute for the Bürgermeister as the Federal Republic of Germany flag was broken out. The Bürgermeister, Dr Kock, then inspected the Parade accompanied by the Parade Commander Lieut Colonel J J Stibbon, the Chief Royal Engineer, General Sir Charles Richardson, the Garrison Commander, Brigadier J P Groom, and the Services Liaison Officer, Lieut Colonel J W W Auger.

Following the inspection the Bürgermeister conferred the Freedom of the Town of Hameln on the Corps of Royal

Engineers, ending with the words "Freedom means Freiheit. We shall strive together in the future for a free Europe". In response, the Chief Royal Engineer presented the Stadt with a Corps sidedrum bedecked with names of campaigns in which the two nations had fought together as comrades in arms, the Peninsula 1808, Walcheren 1809, America 1812, Waterloo 1815 and the Boxer Rebellion of 1900. In his acceptance address the Chief Royal Engineer said "On behalf of the Corps of Royal Engineers I accept with great pleasure the Freedom of the Town of Hameln. Engineer units have served continuously in Hameln since 1946 and have enjoyed an unbroken span of thirty years friendship and hospitality from your citizens. The co-operation and kindness shown to us, together with the beauty of your town and its surrounding countryside, have made Hameln one of the most popular postings for our soldiers and their families. In accepting this signal honour that you have conferred upon us today, the Corps of the Royal Engineers would like to present the Town of Hameln with a Corps side-drum. It is I think fitting that the battle honours inscribed on this drum mark an association of my Corps, as comrades in arms with your people, going back in history some 170 years. I now ask you, Herr Bürgermeister, to accept this Corps Drum as a mark of our gratitude for the hospitality and kindness shown to the Royal Engineers over the past thirty years".

On completion of the presentation ceremonies, permission was obtained for "the Corps of Royal Engineers to Troop the Town of Hameln with bayonets fixed and drums beating" and the parade marched off headed by the Parade Adjutant, carrying the Freedom Scroll. The salute was taken by the Bürgermeister and Chief Royal Engineer on the Rathaus steps, the route being lined by 131 Independent Parachute Squadron (Volunteers) and 28 Amphibious Engineer Regiment Workshop. The Troop of the Town continued through the older parts of Hameln and ended at Bindon and Gordon Barracks, where the participants sat down to a Silver Jubilee Lunch and beer provided free by the Stadt. By this time the Jubilee reception in 28 Amphibious Engineer Regiment Officers Mess was well underway, attended by some 320 guests, about 30 of whom later went on to the Official Stadt Luncheon. At this lunch a further presentation of a Silver Jubilee dish was made to the Stadt who in turn presented two engraved prints of Hameln to 28 Amphibious Engineer Regiment. The afternoon saw the semi-finals and final

of the inter-regimental "Freedom Day" soccer competition, and the celebrations continued into the evening with the All Ranks Jubilee Ball, again attended by both military and civilian German Guests.

A WAY OF LIFE

As the army of occupation became a contribution to NATO and as the NATO commitment continued into the unforeseeable future so a tour in BAOR became a way of life. There was hardly a Sapper, officer or soldier, who did not serve there, often a number of times, and most enjoyed it.

Despite the length of time that British troops had been stationed in Germany (a few units had remained for over 30 years at the location in which their predecessors ended the last War) repeated financial stringency meant that even living accommodation improved only slowly over the period, particularly for those not married. Married quarters were never plentiful, partly because of the steady increase in the proportion of the Army who needed them; in 1967 42 per cent of soldiers were married, by 1977 this figure had risen to 58 per cent. Turbulence was high, aggravated particularly in the 1970s by units serving unaccompanied tours in Northern Ireland. With a predominantly young parental population, not surprisingly the 45,000 children in BAOR were also mostly young; even so continuity of education, despite the existence of 104 service schools in the theatre, was difficult to achieve.

On the other hand the general pattern of military life was reasonably predictable and the ground over which men trained and exercised became well known to the many who served multiple tours in the country. The opportunities for sport, including winter sports, sailing and adventurous training were excellent; opportunities for continental travel and learning the local language were unsurpassed; and financial benefits such as tax free concessions meant that alcohol and motoring were relatively cheap. While in 1960 the young soldier was not sufficiently well paid to take full advantage of these opportunities, improvements over the years meant that by 1980 the majority of all ranks could afford to have their own cars.

Though historians might ultimately come to look back on BAOR as an army which spent half a century playing soldiers in a military wonderland, to those on the ground the threat was

none the less real and it was only necessary to visit the Inner German Border, or Berlin, and witness the intensity of the divide between West and East to appreciate this. The Royal Engineers, as perhaps the most crucial arm in the foreshadowed defensive battle, took their training and operational planning extremely seriously. That they succeeded in enjoying their soldiering and felt a sense of great achievement in what might appear to have been a repetitive cycle of training proves yet again that the variety of tasks and the imagination of the commanders right down to section level would undoubtedly have enabled the Sappers of BAOR to have performed outstandingly had they ever been called upon to fight. It was thus that they contributed to the deterrence which kept the peace in Europe for fifty years.

FOOTNOTE TO CHAPTER III

1. The limitations of this first helicopter were amply illustrated when, on the later exercise at Vogelsang, OC 2 Field Squadron called for the helicopter to pick him up on a particularly hot day and it was unable to lift off with the extra twelve stone. The limited capacity and capability of the early helicopters was to earn the Army Air Corps the soubriquet "Teeny-weeny Airways".

FIGURE 3. ORGANIZATION OF ROYAL ENGINEER UNITS IN GERMANY (Excluding SURVEY AND POSTAL) 1960
(after reduction in number of Divisions from four to three, and break up of divisional Engineer Regiments)

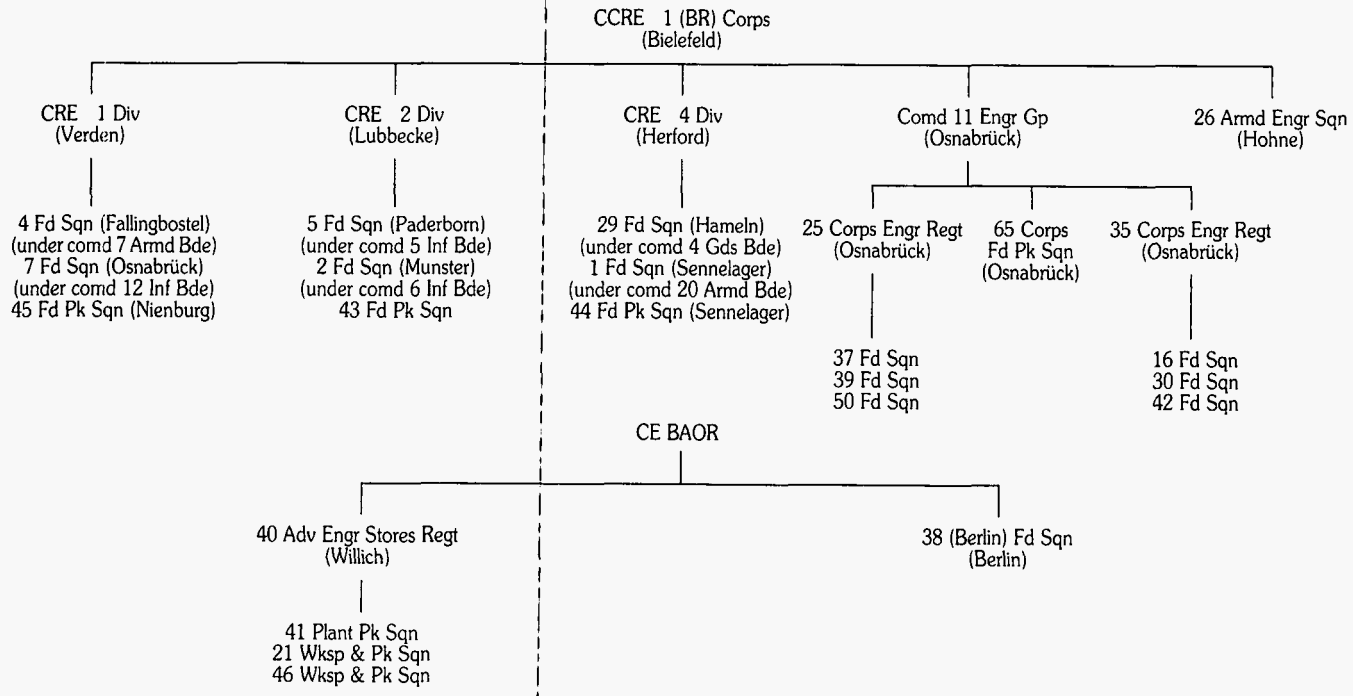


FIGURE 4. ORGANIZATION OF ROYAL ENGINEER UNITS IN GERMANY (Excluding SURVEY AND POSTAL) 1970
(after formation of Engineer Regiments in support of Brigades on breakup of Corps Engineer Regiments)

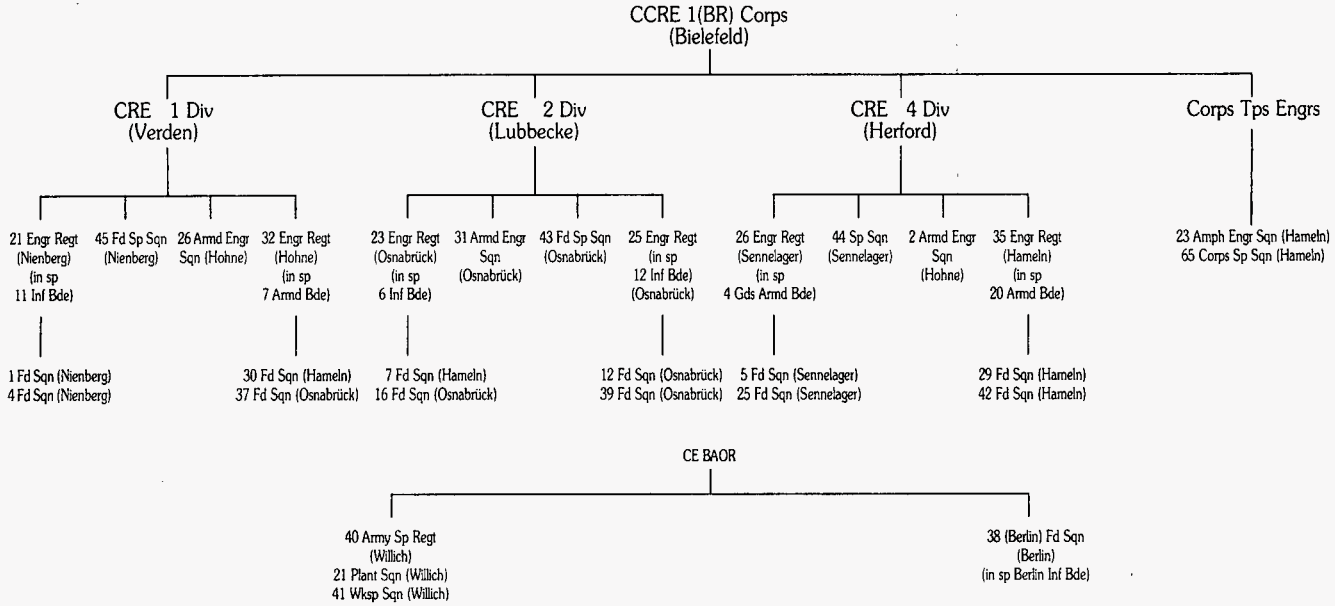
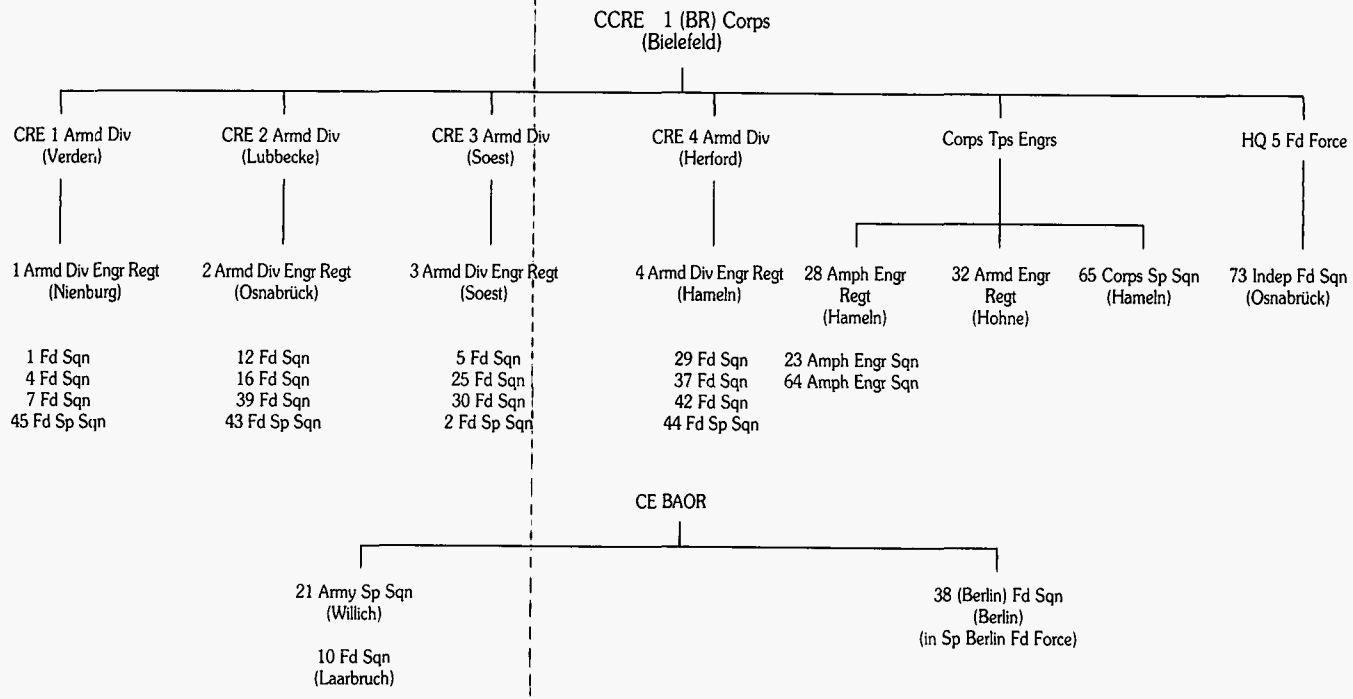

CCRE 1(BR) Corps
(Bielefeld)
CRE 1 Div
(Verden)
CRE 2 Div
(Lubbecke)
CRE 4 Div
(Herford)
Corps Tps Engrs
21 Engr Regt (Nienberg) (in sp 11 Inf Bde)
45 Fd Sp Sqn (Nienberg)
26 Armd Engr Sqn (Hohne)
32 Engr Regt (Hohne) (in sp 7 Armd Bde)
23 Engr Regt (Osnabrück) (in sp 6 Inf Bde)
31 Armd Engr Sqn (Osnabrück)
43 Fd Sp Sqn (Osnabrück)
25 Engr Regt (in sp 12 Inf Bde) (Osnabrück)
26 Engr Regt (Sennelager) (in sp 4 Gds Armd Bde)
44 Sp Sqn (Sennelager)
2 Armd Engr Sqn (Hohne)
35 Engr Regt (Hameln) (in sp 20 Armd Bde)
23 Amph Engr Sqn (Hameln)
65 Corps Sp Sqn (Hameln)
1 Fd Sqn (Nienberg)
4 Fd Sqn (Nienberg)
30 Fd Sqn (Hameln)
37 Fd Sqn (Osnabrück)
7 Fd Sqn (Hameln)
16 Fd Sqn (Osnabrück)
12 Fd Sqn (Osnabrück)
39 Fd Sqn (Osnabrück)
5 Fd Sqn (Sennelager)
25 Fd Sqn (Sennelager)
29 Fd Sqn (Hameln)
42 Fd Sqn (Hameln)
CE BAOR
40 Army Sp Regt (Willich)
21 Plant Sqn (Willich)
41 Wksp Sqn (Willich)
38 (Berlin) Fd Sqn (Berlin) (in sp Berlin Inf Bde)

FIGURE 5 ORGANIZATION OF ROYAL ENGINEER UNITS IN GERMANY (Excluding SURVEY AND POSTAL) 1980
(after Restructuring plan)



CHAPTER IV

THE UNITED KINGDOM BASED STRATEGIC RESERVE

INTRODUCTION - BACKGROUND - Strategic Reserve Concept - Composition - Roles - COMMAND AND CONTROL - UK Geographic Commands - ORGANIZATION - 3 Division - ACE (MF) - Royal Marine Commandos - Engineer Support - Restructuring - Summary - LIFE IN THE STRATEGIC RESERVE - Introduction - 1963 - 1972 - General - ASSISTANCE TO THE CIVIL COMMUNITY - General - Disaster Relief - Industrial Disputes - Other Assistance to the Civil Community - ASSISTANCE TO THE MILITARY COMMUNITY.

INTRODUCTION

Throughout this period the United Kingdom remained the springboard from which the majority of military reinforcements to overseas theatres were launched. The nerve centre remained in London and the rest of the British Isles seldom housed less than the equivalent of a division of field force troops. The map of the United Kingdom was peppered with a huge array of depots, garrisons, training and logistic units and installations; and as a ready reinforcement for time of war, practically every major town throughout the land had some resident Reserve Army presence. Overseas, at the start of this period, operational and logistic command was, in the main, delegated to each theatre for which each possessed a large headquarters. As withdrawal proceeded, however, and troops returned home these command functions returned too, to be carried out for a brief spell by a specially established Strategic Command at Wilton. Subsequently, with further reductions, the increased priority of support for NATO, and the decreased likelihood of any brigade-sized operation being mounted from these shores for service outside Europe, this headquarters was renamed Headquarters United Kingdom Land Forces. In this chapter we shall trace some of the activities of the Royal Engineers who were based in England at the time, against this ever changing background.

BACKGROUND

Strategic Reserve Concept

The 1957 Defence White Paper announced the end of National Service and the withdrawal of troops from the majority of overseas bases, and in so doing heralded the era of the United Kingdom-based Strategic Reserve. The concept was for a powerful, mobile force, capable of despatch to anywhere in the four corners of the globe, in formations tailored to meet the particular circumstances, but not usually larger than all arms brigade group in size, and normally to be deployed by air. However, shifts in the political background over the twenty years with which we are concerned gave rise to major changes in the roles of this Strategic Reserve, leading in turn to quite complex patterns of unit moves. If described in detail a largely indigestible and incomprehensible catalogue would result. Accordingly a chart is attached at Figure 6 which displays all such moves of units within the Reserve over this period in diagrammatic form, and the text of this chapter only records such moves when they are considered to be particularly significant.

Composition

In the front rank of this organization were 3 Infantry Division and 16 Parachute Brigade, each with their own integral Royal Engineer Squadrons. Early in the period and in order to develop a closely integrated airportable capability, Headquarters 38 Group RAF was formed to command and train the appropriate Air Force units. Army Field Force units behind these formations and available as backup to them, such as the UK - based corps engineer regiments, became part of what was known as the Support Echelon. In the early 1960s, too, the Reserve Army became much more integrated with its regular counterpart, by providing in particular badly needed additional units which the country simply could not afford to maintain on its regular establishment in peacetime.

Roles

The first decade of the 1960s saw the heyday of Strategic Reserve operations. Hardly a month went by without troops becoming involved either in shooting wars somewhere in the

world (such as Aden and Borneo) or in rapid deployments to theatres to forestall them (such as Kuwait and Cyprus). For the Sappers there were, in addition, countless overseas projects to be done, and from time to time, military aid to be provided at home for the civil community. In October 1961 it was suddenly announced that, as a result of increasing East/West tension culminating in the building by the Russians of the Berlin Wall, the Strategic Reserve was to have a major additional task, that of providing support for BAOR both on the Central Front and on the flanks of NATO. The 1968 Defence White Paper, however, reversed the priorities of roles; first priority for the United Kingdom Mobile Force, as it had become, was now to be the reinforcement of NATO in Europe, though the Force was still to retain its capability of deploying up to a brigade elsewhere if necessary. Thereafter the emphasis previously placed on strategic airportability began to dwindle, although exercises were still held abroad in countries such as Kenya, Cyprus and Canada.

COMMAND AND CONTROL

UK Geographic Commands

For many years prior to 1968 the United Kingdom had been divided into five geographic commands - Scottish, Northern, Western, Eastern and Southern - with a Chief Engineer on the staff of each headquarters. Commands were further divided into a total of twelve districts, who administered the units in their area, and were responsible for co-ordination of training resources. They also exercised some measure of operational control of units, though this was not always clearly defined, particularly when such units were deployed overseas. Thus the opportunity was taken in 1968 when geographical areas were regrouped into a total of four commands comprising ten districts, for operational command of all field formations and units to be vested in the previously mentioned single new Headquarters Army Strategic Command, at Wilton. Its life, however, was short lived as its place was taken on 1 April 1972 by Headquarters UK Land Forces. Headquarters 3 Division and the ten district headquarters now became responsible for the day-to-day administration and running of their own units and establishments in the United Kingdom, as shown on map 2.

ORGANIZATION

3 Infantry Division

Throughout the 1960s the main all Arms strategic reserve formation was 3 Infantry Division consisting initially of 19 Brigade, trained and equipped on ultra light weight scales for airdrop operations, and 51 Brigade prepared for heavier airportable tasks. The RE support was provided by 3 Division Engineers (retitled 22 Engineer Regiment in 1971) consisting of 3 Independent Field Squadron in support of 19 Infantry Brigade, 23 Independent Field Squadron in support of 51 Infantry Brigade, and 6 Field Park Squadron. In 1962, 23 Independent Field Squadron reduced to cadre and moved to BAOR to form the nucleus of a future amphibious squadron and (even more of an innovation) 68 Gurkha Independent Field Squadron joined the division in support of 51 Infantry Brigade. Their stay was a brief one, however, as with the increasing commitments in South East Asia (and Borneo in particular) they returned to FARELF at the end of 1963 having adapted themselves in exemplary fashion to the European environment during their tour. In the same year 51 Brigade left the Division for Borneo. In 1964, 5 Infantry Brigade supported by 34 Independent Field Squadron joined from BAOR and in the same year 16 Parachute Brigade with 9 Independent Parachute Squadron came under command of the Division. 3 Division Engineers reached their peak in size and responsibility in 1967 when 8 Field Squadron supporting 24 Infantry Brigade, having distinguished themselves in Aden, also joined the formation.

Thereafter, during the 1970s, the combined effects of increasing responsibility for participation in Rhine Army operations, plus cuts in public expenditure leading to a restructuring of the Army (discussed in more detail below), had a profound influence on the organization of divisions and thus its Engineers. 9 Parachute Squadron left when 16 Parachute Brigade were detached to the Joint Airborne Task Force in 1970, by which time 3 Infantry Division had become the main land element of the United Kingdom Mobile Force, with a primary role of the reinforcement of NATO forces in Europe. Mention must also be made of the burden throughout the 1970s of providing sapper units, often in an infantry role, for Northern Ireland. Ever since a troop of 34 Field Squadron was deployed in 1969 to counter the deteriorating situation there, a steady

stream of Strategic Reserve squadrons completed emergency tours of varying natures, as is described in detail in Chapter 10.

Allied Command Europe Mobile Force
In 1965 the United Kingdom offered to make a contribution to the land component of this force, known as AMF (L) for use on the flanks of NATO - Scandinavia in the North and the Eastern Mediterranean in the South. The British contribution became a battalion group, including a Royal Engineer troop, and several logistic units. The troop was found initially as an ad hoc commitment by each of the 3 Infantry Division field squadrons in turn; it trained in winter warfare annually on Exercise Hardfall, but was available for normal duties for the remainder of the year. In 1973, however, it was apparent that a greater degree of specialization was required and a permanent Independent AMF (L) Troop was established.

Royal Marine Commandos
In 1971, 59 Field Squadron, who had for some years been providing support for the Royal Marine Commandos, became officially affiliated to them and after appropriate training all ranks of the squadron were eligible to wear the distinctive green beret.

Engineer Support
Support for the Strategic Reserve was co-ordinated by HQ 12 Engineer Group, initially located at Woolwich, under command of which all non-divisional Engineer Regiments and Specialist Teams were placed. In 1960 this consisted of 36 Corps Engineer Regiment at Maidstone (20, 24 and 57 Field Squadrons) and 38 Corps Engineer Regiment at Ripon (48 and 12 Field Squadrons and 15 Corps Field Park Squadron). The following year the first Specialist Teams RE were formed: 516 (Bulk Petroleum) joined 36 Engineer Regiment at Maidstone and 513 (Airfds) joined 38 Engineer Regiment. At the same time 32 Construction Squadron moved from Gibraltar to Ripon and 57 Field Squadron began to run down to cadre before amalgamating with a training squadron within the Training Brigade. In 1962, 59 Field Squadron started to form at Maidstone, though it left two years later for Operation Crown in Thailand when 60 Field Squadron was raised to take its place in 36 Engineer Regiment. 1964 saw a number of changes in the order of battle. 10 Field

Squadron (Airfields) formed at Maidstone in readiness for service in the Persian Gulf the following year and 521 STRE (Well Drilling) was also raised. At Ripon, 73 Field Squadron joined 38 Engineer Regiment on completion of their tasks on Christmas Island, while 12 Field Squadron moved to BAOR. In 1965, with the assumption from the RAF of responsibility for airfield construction a new regiment, 39 Engineer Regiment (Airfields), was established at Waterbeach. By the end of that year it consisted of 51, 52 and 53 Field Squadrons (Airfields). By this time, 62 CRE was also formed at Wilton (though it moved to Barton Stacey in January 1966) to take over command of the specialist teams, which were at that time:

521 STRE (Well Drilling) previously attached to 36 Engineer Regiment.

516 STRE (Bulk Petroleum) also previously at Maidstone.

524 STRE (Construction), newly formed at Barton Stacey.

Two years later, these teams were joined by 513 STRE (Roads) and 523 STRE (Construction). In 1967, a further corps engineer regiment started to form at Longmoor. Numbered 37, it took 33 Field Squadron (recently returned from Cyprus) under command, and was joined by 10 Field Squadron the following year when it returned from the Persian Gulf. At this time too the plant troops hitherto held by commands were amalgamated, and the resulting 66 Plant Squadron also joined the Regiment. In 1971, with the growth in number of specialist teams, 64 CRE was formed and 516 and 521 STREs transferred from 62 CRE.

Restructuring

A major restructuring of the Army took place in 1977 as a result of prolonged studies begun in 1974. The aim was to improve the Army's "teeth to tail" ratio, the most radical measure being to remove the brigade level of command. This had major effects on the Strategic Reserve. HQ 3 Infantry Division moved to BAOR to become HQ 3 Armoured Division. Trials however showed the

necessity for a level of command between division and battlegroup, and new formation headquarters with the title of Field Force were set up in place of the old brigade headquarters from which all logistic control had been removed. In summary, the main roles of the UK Sapper units were now as follows:

22 Engineer Regiment	Home Defence in support of 8 Field Force (Bulford)
36 Engineer Regiment	SACEUR Reserve, in support of 6 Field Force (Aldershot)
38 Engineer Regiment	BAOR, in support of 5 Field Force (Osnabrück)
39 Engineer Regiment	BAOR, in support of 7 Field Force (Colchester)
Engineer Support Group	Engineer support of major projects and operations

At the same time Airfield Squadrons were redesignated Construction Squadrons, and were distributed between the four UK - based engineer regiments, while 39 Engineer Regiment lost its identification with the Airfield role. The reasoning behind this change in nomenclature lay in the fact that it had been found over many years that construction projects were continually being carried out by the Corps and particularly by units of the Strategic Reserve. It had also been found that the field squadrons (airfields) spent more of their time on average on general construction than on airfields. Some teething problems tended to occur when a field squadron was switched from military duties and combat engineering to construction, though in every case it was not long before the unit settled down to its new work. There was also the problem of the artisan tradesman who wished to pursue his skill but seldom got sufficient opportunity. During the restructuring study of 1974 it was, therefore, considered essential to stress the versatility of the Corps and to show that its units offered very good value in peace as well as in war. Accordingly it was decided to include one squadron in each of the four regiments that had an

establishment in both personnel and equipment that was more suited to construction, though retaining its ability to fulfil the normal role of a field squadron. This arrangement was designed to offer greater efficiency in the execution of projects, many of which were of such a short term as not to allow a "learning" period, and to give greater satisfaction to (and therefore help the retention of), skilled artisan tradesmen. At the same time due allowance had to be taken of the increasing commitment to supporting the RAF, both the Harrier force and in airfield damage repair.

LIFE IN THE STRATEGIC RESERVE

Introduction

Life in any of the engineer regiments and squadrons was so busy that there was little time for most Sappers to appreciate the nature, complexity and diversity of the changes then taking place in the Army's role and deployment. It would not have appeared to the average Sapper serving in the UK that there was any reduction in the work required of him or diminution of the Army's role overseas. On the contrary, he seemed even more likely to be despatched to some distant place overseas of which neither he nor his friends had previously heard. Though the nature of the tasks changed over the twenty years with which we are concerned, the high level of activity for units remained constant throughout. A contemporary account of the year 1963 for 20 Field Squadron based in Maidstone typifies the tempo at which such units lived at the early part of the period.

1963

Immediately after the Annual Administrative Inspection in January, held in such bitter cold weather that the snow had to be scraped off the square with a grader, the majority of the Squadron went on upgrading or specialist training courses either in the Regiment or at the RSME. A party of thirty went to the British Legion Hut in Aviemore, Inverness-shire, for a week's ski training, while twelve others went winter warfare training with the Norwegian Army in Norway. During March the squadron took part in a Regimental bridging gallop from Scotland to the Thames, during which it built two heavy ferries on Loch Ryan, moved down to Newark to build a light floating bridge (LFB), moved south again to build a light assault raft on the River

Crouch and finally built a LFB and two heavy ferries across the River Thames near Henley, with an army of pressmen and photographers watching. 1 Troop then went to Canada with 24 Field Squadron for six weeks, where they constructed a road. The remaining troops carried out demolitions and spent almost a month on the RE Demonstration at Gordon Barracks. When regathered at Maidstone, the unit practised an airportability exercise in barracks, fired their annual range course for ten days, paid another visit to Aviemore for adventure training and departed on well earned August block leave.

Thereafter, preparations began for a forthcoming tour in Christmas Island. On 23 September the squadron left for a five day bridging exercise on the Romney Marshes with heavy girder bridges (HGB). After a few days in Maidstone the Squadron departed for Stanford Practical Training Area for a series of exercises in riot drills, cordon and search and anti-terrorist activities. 2 Troop flew to Benghazi on 13 October for Exercise Quickstrip the construction of a light air strip in Wavell Barracks for the 14th/20th Hussars. Squadron HQ and 1 Troop went to El Adem from 1 to 11 November, trained in the desert and carried out some improvements to a local track. 3 Troop went on embarkation leave. The year ended with an intensive period of cleaning up and preparation for the next administrative inspection and the final reorganization for Christmas Island for which the squadron left by air in December.

1972

Nearly ten years later, by which time the priority of tasks had switched from worldwide operations to support for BAOR, regimental life continued to maintain its hectic tempo. Typical was the experience of 38 Engineer Regiment at Ripon, whose primary role in theory was to provide support to the RAF Germany Harrier force. As a result a good deal of time was spent exercising in West Germany, rehearsing the rapid construction and maintenance of tactical strips, hides, taxiways and forward operating pads. At home, support was provided for the UK based Harrier squadron based at Wittering on several exercises in the more remote areas of Britain or on the flanks of NATO including North Norway, and help was given at many demonstrations and displays culminating in the Farnborough Air Show. However, the regiment was also continuously at a week's notice to move anywhere by air. Thus, 15 Field Support

Squadron went to Ethiopia, and 32 Field Squadron to the Sudan, to give assistance to the civil communities. In Gibraltar, a troop of 11 Field Squadron spent six months working on the Europa Road project, and a troop from each of 11 and 48 Field Squadrons completed separate six month tours in Belize, while part of 48 Field Squadron spent four arduous, but fascinating months in the highly contrasting environment of Oman. (These activities are described in greater detail elsewhere in this volume).

At home, projects ranged from the erection of a triple - double Extra Widened Bailey Bridge with a 210 foot main span across the River Swale for use by RAF Leeming, to the construction of a new earth dam for the Army Ski Centre at Rothiemurchus in the Cairngorms. A tarmac road was built by 15 HQ Squadron across the Sennybridge ranges, while in Snowdonia dangerously steep slate ramps were dozed into the almost inaccessible quarries of Llanberis to enable the RAF's EOD teams to reach and dispose of several hazardous dumps of disused wartime ammunition. And the three field squadrons between them found time to carry out four emergency tours in the border areas of Northern Ireland.

General

For the soldier returning to UK after a tour in BAOR comparisions were inevitably drawn between the quality and style of regimental life on either side of the North Sea. Germany provided the unattached young Sapper with more time in formation training, more cash in his pocket and a general broadening of outlook, but off duty time had frequently weighed on his hands there and many had obtained very little practice at their artisan trades. Service in the UK (with the exception of Northern Ireland) normally gave him a five-day week, better accommodation, more trade satisfaction and a far wider opportunity to travel. However, the relatively isolated barracks such as Waterbeach, Ripon and Longmoor lacked the widespread facilities of a large garrison such as Osnabrück; for evening entertainment the sapper had little alternative to his troop television set other than a visit to a local pub unless he belonged to the energetic few who played badminton, went small bore shooting or pursued some other local activity. Essentially, therefore, the more the single soldier was away from

barracks doing active, demanding work, the happier he was, and so were his superiors. For the married man (comprising some 45% of the total) the situation was less clear cut. In the 1970s he and his wife were invariably a good deal worse off financially than their BAOR contemporaries but on station quarters were plentiful. The annual separation rate in field squadrons of 38 Engineer Regiment between 1972 and 1974 averaged 50%; put another way, most men were away for six months of the year. Many wives became well hardened to this and accepted it, often obtaining jobs to supplement the family income while the man of the house was away. Others found it much harder to accept, particularly the new bride who had recently moved from the stability of her old home town.

This account will have given an idea of the intensity of life in a Strategic Reserve Sapper unit. The demands of preparing for the war role, the recurring commitments to Northern Ireland, the need to respond to emergencies at home and overseas, and the call to carry out overseas projects left little time for individual and unit training. Nevertheless, this period more than made up for such shortcomings by providing boundless opportunities for all ranks - particularly perhaps junior officers and NCOs - to use their initiative, develop their self confidence, and to hold at times what were not inconsiderable responsibilities, which they seized with enthusiasm.

ASSISTANCE TO THE CIVIL COMMUNITY

General

Busy though they were, the Strategic Reserve Sappers also responded readily to calls at home for disaster relief, assistance in industrial disputes and to general help to the community in other ways.

Disaster Relief

There were many occasions during this period when natural or manmade disasters occured in or around the United Kingdom and where the expertise of the Corps was called in to help, and there is only space to mention a few examples. In 1960 there was extensive flooding in various parts of the country; between October and December 36 Corps Engineer Regiment ferried the

stranded to safety, constructed footwalks and secured property when the River Medway overflowed its banks while 48 Field Squadron rendered assistance at Hornchurch in Lincolnshire and 63 Field Squadron were engaged in rescue operations at Newark. In Cardiff, 23 Field Squadron built a Bailey bridge to carry a relief water main. Two years later, storm force winds swept the country in February doing extensive damage. 12 Field Squadron, supported by elements from 15 Field Park Squadron, carried out emergency repairs to some 2000 roofs in Leeds and Sheffield.

In March 1967, 9 Independent Parachute Squadron was involved in the clearance of several Cornish beaches after a giant oil spill from the tanker *Torrey Canyon*. In July of the same year gale force winds again struck the country from Devon to the Wash, with the West Country suffering the worst damage and four inches of rain fell in the Honiton, Taunton and Bristol areas during one night. Bridges were swept away including the A30 bridge at Fenny Bridges, the A37 bridge at Pensford, the A303 bridge at March and the main road bridge at Keynsham. HQ 12 Engineer Brigade were duly alerted and within 48 hours 20 Field Squadron was on its way to Fenny Bridges and 60 Field Squadron to Pensford, both units coming from 36 Engineer Regiment at Maidstone. Fortuitously, 71 (Scottish) Engineer Regiment (V) was due to move to Wyke Regis bridging camp for its fortnight's annual camp just at this time. Its three field squadrons moved almost straight off the train from Scotland to three other bridge sites. HQ 12 Engineer Brigade deployed on site to control the operation as the force built up to two complete regiments plus a seventh field squadron, about one hundred load carriers from four RCT units and the T&AVR Movement Light Squadron. Engineer Stores Group issued and loaded some 500 tonnes of EWBB and HGB. The Army Air Corps provided helicopters flying in reconnaissance parties at the outset and assisting greatly thereafter. Within four days work had been completed, involving the construction of eight equipment bridges of average span over one hundred feet.

In 1971, 8 Field Squadron helped to repair the Menai rail bridge after it had been extensively damaged by fire[1], and 34 Field Squadron over-bridged the River Yarty at Axminster for Devon County Council. Three years later, there were more severe floods in the South of England, again in February. This time 34 Field Squadron carried out protective work to prevent

the flooding of Chitterne, on Salisbury Plain, and 20 Field Squadron and 61 HQ Squadron were called upon to rescue and help the people of Maidstone.

Industrial Disputes

In the late 1960s and into the 1970s, the UK faced growing economic problems bringing a steep rise in inflation, erosion of civilian wage differentials, fear of unemployment and increasingly extravagant wage demands, backed in many cases by powerful trade unions. On many occasions negotiations broke down and sometimes troops were called upon to maintain essential services brought to a halt by the disputes. There were breakdowns of this nature involving firemen, postmen, power workers, prison staff and drivers of key vehicles. Sappers were usually among the units of the armed services brought in to carry out tasks that were unfamiliar, often unpleasant and always difficult and sensitive. For example, in October 1970, Sapper units were involved in clearing rotting offal and vegetables in Tower Hamlets area of London during a manual workers pay dispute, and two months later they were required to provide and install emergency electrical generators in many hospitals during a power workers dispute.

In March 1975, a strike of heavy goods drivers of the Municipal Cleansing Department of Glasgow Corporation caused an accumulation of rubbish that soon became a major health hazard. Operation Slant was mounted and the RE element of the task force sent in consisted of four composite troops, one from each of the engineer regiments of Strategic Reserve, grouped together as the Glasgow Support Squadron, with HQ 71 (Scottish) Engineer Regiment (V) also participating. The troops, who were equipped with light and medium wheeled tractors, tippers and dump trucks, began work on 19 March and continued until 9 April when the dispute was resolved. A nationwide firemen's strike took place late in 1977 and units of all three Services were called in as part of Operation Burberry to assist the fire authorities in maintaining fire cover. Large numbers of obsolescent fire tenders, known as "Green Goddesses", were taken out of storage and issued to the troops. Many RE units provided teams to man the equipment, and staff to help at county headquarters; Military Survey also supplied town plans to districts and units. At the peak of the

operations some 20,000 servicemen were involved. One engineer regiment, probably typical of all four, reported calls to 1800 incidents by the time the strike ended nine weeks later, during which time they had fought nearly 1300 fires[2]. The operation continued over Christmas and concluded in the following January, and throughout the period Sappers and those of the many other Arms and Services involved had been greeted with enormous enthusiasm and tolerance and had received much generous hospitality from local people.

Other Assistance to the Civil Community

A third group of tasks within the Civil Community which Strategic Reserve units performed were straightforward construction projects[3], mostly for government bodies and the tourism industry. These offered excellent scope for training as well as low-cost solutions for the customer, but such projects were not always welcome to the private sector of the construction industry who feared that the Royal Engineers could be taking work away from them. A procedure was therefore developed called Military Aid to the Civil Community (MACC) under which formal application for such tasks had to be made first to the Ministry of Defence, where factors such as accessibility of the project to normal contractors, its training value, local and political considerations and costs were all taken into account. Under this scheme many useful projects were carried out and some idea of their variety can be gleaned from the examples which follow; overseas projects are covered in Chapter 5. In 1960 a task for the Forestry Commission was undertaken by 38 Engineer Regiment which involved the dismantling of a 130 foot Bailey bridge across the River Tyne at Plashetts, a remote spot in Northumberland, and its replacement with a three span bridge. The bridge, constructed of reinforced concrete decking on rolled steel joists supported on piled piers, was designed and built by 48 Field Squadron. 521 STRE drilled wells on Havergate Island, Suffolk, for the RSPB, in 1966.

Two years later, some 46 projects were recorded as having been completed by the Corps in Scotland alone, including the building of an airfield at Unst in the Shetland Islands. The following year 37 Engineer Regiment demolished two disused bridges over the A34 at Lichfield, and 38 Engineer Regiment constructed a 275 foot broken span HGB and camps for the

Investiture of HRH The Prince of Wales at Caernarvon. In 1970, 48 Field Squadron built a 550 foot HGB over the River Ouse at King's Lynn as an emergency crossing to replace the Cut Bridge that had become unsafe; 10 Field Squadron laid trackway and constructed temporary bridges for the Commonwealth Games at Edinburgh; and 9 Independent Parachute Squadron carried out rock blasting and bridge building tasks in the Channel Islands. Scotland often provided a useful venue for these projects as has been seen. 66 Plant Squadron built a 2600 foot airstrip at Broadford on Skye in 1971 and a 40 metre Acrow Panel bridge over the Oykel in 1975, while in 1972 38 Engineer Regiment constructed a 60 bed Scout hostel at Auchengillan. An unusual and exciting project which caught the public's eye was the construction of a Harrier Ski Jump at the Farnborough Air Show by 38 Engineer Regiment in 1978. Undertaken at the request of British Aerospace, executed in cooperation with Fairey Engineering, it was the centre-piece of the show and the jump was constructed again for a repeat performance in Paris.

ASSISTANCE TO THE MILITARY COMMUNITY

Even before Works Services was transferred through stages to the Property Services Agency (PSA) it had been easier for the Royal Engineers to gain military construction experience overseas than in the UK, where employer or trade union objections were more likely. The requirement was for the Corps to work in areas where the PSA could not carry out construction, either for security reasons, lack of time for contract action, lack of funds or lack of a contractor. Gradually, however, as the Defence budget was increasingly cut back, the financial savings that could be made by Sappers, rather than contractors, doing the work became more appreciable. It was essential, in order to foster this trend and for the good name of the Corps, to ensure that the quality of the Sapper work was of the highest standard, and it was here that the great value of the specialist and experienced Military Engineer Services Organisation was of paramount importance in ensuring good design and good quality control in construction. Among numerous such projects the following serve as typical examples. Between 1966 and the end of the decade, 3 Division Engineers and 38 Engineer Regiment constructed medium range transport (MRT) airstrips

on Salisbury Plain and at Plockton in Scotland; the Upnor to Chattenden road was built; 36 Engineer Regiment built an airstrip at Barry Budden; 521 STRE drilled wells at Stanford PTA and 6 Field Squadron repaired the pier at Gairloch. In 1970 24 Field Squadron, 52 Field Squadron (Airfields) and 66 Plant Squadron all worked on road construction at Chatham while 62 CRE, 10 Field Squadron and 33 Field Squadron worked on the extension to the RAC Museum at Bovington.

Two years later, 36 Engineer Regiment worked on the perimeter road construction at Sennybridge. Before the end of the period with which we are concerned, 61 Headquarter Squadron and 20 Field Squadron constructed a games hut for the small garrison on St Kilda. 22 Engineer Regiment reconstructed Imber Village on Salisbury Plain and modified the ranges at Bulford, while 6 Field Support Squadron constructed a roll-on-roll-off facility at Marchwood. The close quarter urban battle range at Hythe was also extended by Sappers and the Corps assisted with the construction of the training circuit for the new Army Driving centre at Driffield in Yorkshire, saving £160,000, while 20 Field Squadron laid 2 km of railway line at Lydd ranges saving another large sum of money for the PSA. During this period a number of works were also undertaken for the Royal Navy.

So much then for the multitude of tasks for which the Sappers became responsible in the United Kingdom. It is now appropriate to turn to the equally wide spectrum of such work carried out with similar energy and skill across the length and breadth of the world elsewhere, in keeping with the motto of the Corps, and which is the subject of the following chapters.

FOOTNOTES TO CHAPTER IV

1. The deployment of a unit to carry out the project was a relatively simple matter for the MOD compared with the preparation of the appropriate paperwork, as under the recently defined MACC rules a contract had first to be placed with British Rail who were to be charged full costs including capitation fees for all ranks involved. Lieut Colonel G W Preston-Jones recalls drafting a hastily improvised document in ASD7 branch which was rushed round to Euston for signature; whether the £¾ million quoted was ever recovered by the Ministry remains a mystery.

2. It is said that one of the Sapper parties driving a Green Goddess was called to the traditional task of rescuing an old lady's cat from the top of a tree.

This was achieved in such style that in her gratitude the old lady invited the lads in for a cup of tea. They drove out of her drive waving goodbye with a flourish, but sadly spoilt the effect by running over the cat as they did so.

3. There were also some "destruction" ones. During the summer of 1967 Radio 390, one of many pirate stations, was operating from a disused anti aircraft gun fort 12 miles off Felixstowe at Rough Sands. The Government decided that the transmissions should be terminated and the fort demolished as an example to other pirates. 3 Troop of 24 Field Squadron, having just completed three weeks demolition training, were deployed to the fort in the wake of a Royal Marines Boarding Party, travelling by sea-going tug and helicopter. Some four days later about two tons of high explosive reduced the fort to two fists of reinforcing bars jutting out into the North Sea.

CHAPTER V

INDEPENDENT OVERSEAS OPERATIONS BY UNITED KINGDOM BASED UNITS

INTRODUCTION - OPERATIONS - The Cameroons - Anguilla - Zimbabwe - PROJECTS - Belize - Turks and Caicos Islands - Honduras - Dominica - Falkland Islands - St Helena - Ethiopia - Malawi - Sudan - Botswana - Rodrigues - Christmas Island - Pitcairn Island - Saudi Arabia National Guard - EXERCISES - Introduction - Canada - Elsewhere.

INTRODUCTION

There were many occasions when UK based units were temporarily deployed overseas either as reinforcements or to carry out specific projects. In the majority of cases these were in areas where there already existed a British military command structure and, for ease of reference, these are described in those chapters relating to the particular geographical theatres concerned. This chapter covers those occasions when UK units were sent independently to locations elsewhere in the world to carry out operations and exercises while remaining under United Kingdom command. There were far too many for them all to be recounted here but it is hoped that those that follow will serve as a representative cross-section. They are listed in broadly geographical sequence.

Although reinforcing NATO had become the priority role of the UK Strategic Reserve, many events occurred requiring the planned or emergency despatch of units overseas. The strong engineer element in the forces used reflected the philosophy that engineering had a part to play in its own right, in reducing tension in countries threatened by internal or foreign inspired subversion. Improvements in communications in such countries would allow quicker deployment of government forces and influence in remote areas. Also, the more that health care and community development programmes could be encouraged the more conditions in which subversion could flourish would be eliminated. Military engineering, therefore, had a strategic role to play even when shooting wars came to an end. Over this period these principles of keeping the peace gradually became embraced more by the new nations themselves, but right up to

the end of the period with which we are concerned the Corps was fortunate in being able to seize many opportunities for worthwhile and challenging jobs in interesting places.

Operational requirements had, of course, overriding priority, but where other opportunities for overseas deployment arose the relative merits of such activities had to be weighed against other commitments and the risk of over-stretching units and individuals, not least as regards family separation. The aim of such overseas development or assistance projects was to foster British interests in the area; but the other important factors governing decisions to undertake them included the value to the country concerned and individual and unit training value to the Corps.

Indirectly, too, the Corps' participation in development projects helped recruiting as the opportunities for making purposeful use of management, engineering and artisan trade skills not only provided excellent training but encouraged the retention of skilled personnel. Mistakes were made in some of the earlier projects but these became far less as the roles of 62 CRE (Construction), 64 CRE (E & M) and of the Specialist Teams were developed and accepted. When circumstances permitted these two CRE organizations assumed the position of engineering consultants to the Corps. In these cases the planning and execution of a project followed the normal civil sequence of a feasibility study and initial report, followed by detailed design and final proposal and, if these were accepted, specialist supervision on site. This system usually saved time in the long run and probably always raised the quality of design of the work. However, whenever possible, opportunities had also to be provided for the regimental Sapper officer to practice the design and construction skills he would be called upon to exercise in war. In general, therefore, the great majority of those who took part in these operations and projects shared to the full the satisfaction of work done well in difficult conditions, gained from the experience and earned the gratitude of British diplomatic representatives and of the people of the countries concerned.

OPERATIONS

Three entirely different operations were carried out during this period which are of interest because they illustrate the

extraordinary diversity of tasks which confronted the army from time to time. They are described in chronological order and all arose because of the political aspirations of the local population (or their neighbours) once colonial rule had been withdrawn.

The Cameroons

On the coast of equatorial West Africa, with Nigeria as its northern neighbour, lay the mountainous one-time German colony of Kameroun. By 1959 the area had been split into two United Nations' Trust Territories, the Cameroons, that in the east administered by the French and that in the west by Britain. At the beginning of October 1960 Nigeria was to be granted independence and the northern half of the British administered Cameroon elected to be included within the new Nigerian boundary. The following year a plebiscite was to be held to determine the future of the remainder. Fears of a possible conflagration, stemming in part from the reawakening of old tribal rivalries by these political activities, led to the emergency deployment in August 1960 of troops from the UK, including the SME Support Squadron (59 Field Squadron less one troop), to the Southern Cameroons in support of the 1st Battalion Kings Own Royal Border Regiment. The squadron was reinforced by elements of a specially formed 160 Works Section and their role during August, September and October consisted of the inevitable emergency camp construction tasks, such as hutting, water and electricity supply and road building, working against time under atrocious conditions. Towards mid-October the battalion started full scale anti-terrorist operations along the eastern frontier with what had now become the independent Republic of Cameroon and while a proportion of the squadron remained on works the rest moved over to operations in support. Typical tasks were the construction of tracks to enable ¼ ton trucks to reach infantry patrol bases with their associated culverting and small timber bridges; road maintenance; anti-terrorist anti-smuggling patrols; and the provision of mine-detector parties to accompany police and infantry in their searches for arms. By the end of 1960 the camp construction commitment had tailed off and the whole unit was deployed as infantry throughout the Cameroons awaiting the results of the Plebiscite. In the event the transition of the area into a Federal Republic of two independent states passed off with little violence

and the squadron was relieved by a troop from 20 Field Squadron in May 1961 and they, in turn, left in October.

Anguilla

On 27 February 1967, a group of islands in the Caribbean - St Christopher, Nevis and Anguilla - who together had previously formed a British colony, became independent and fully responsible for its internal affairs while the British Government maintained responsibility for defence and external affairs. About three months later, however, on 30 May, a party of Anguillans ejected the police from their island, which was small and undeveloped with a population at that time of only 6,000, and declared that they were severing all constitutional links with the new government. Thereafter a number of attempts were made to resolve the crisis but all were unsuccessful. Early in 1969 the Anguillans declared themselves wholly independent and on 11 March forced a visiting British Minister out of the island. As a result the UK agreed with the Islands' government to instal an official as Her Majesty's Commissioner and to send in troops and police to restore official law and order.

There were no suitable locations for a major initial beach assault so the force of two companies of 2nd Battalion Parachute Regiment and a section of 9 Independent Parachute Squadron who landed at Crocus and Road Bays on 18 March 1969 were put ashore in Gemini craft from frigates standing off at sea. They moved inland on foot to secure Wall Blake airstrip and await the airlanding of their heavy equipment. Members of the Metropolitan Police were also included in the force[1].

There was little or no violence after the arrival of the troops and it became apparent very quickly that the most useful contributions the armed services could make would be by developing the public utilities. The island had few resources and very limited fresh water, so a force of about 80 men from 33 Field Squadron (Major R C Plummer) of 37 Engineer Regiment was sent. The 2nd Battalion Parachute Regiment was withdrawn except for one company, together with the section of 9 Squadron. At this time, too, a professional Works officer from 62 CRE (Major J C Peacey) went out to the island to recommend appropriate tasks for the foreseeable future and his proposals included improvements to roads, schools and water supply and the construction of a deep water jetty.

The detachment from 33 Field Squadron remained on the

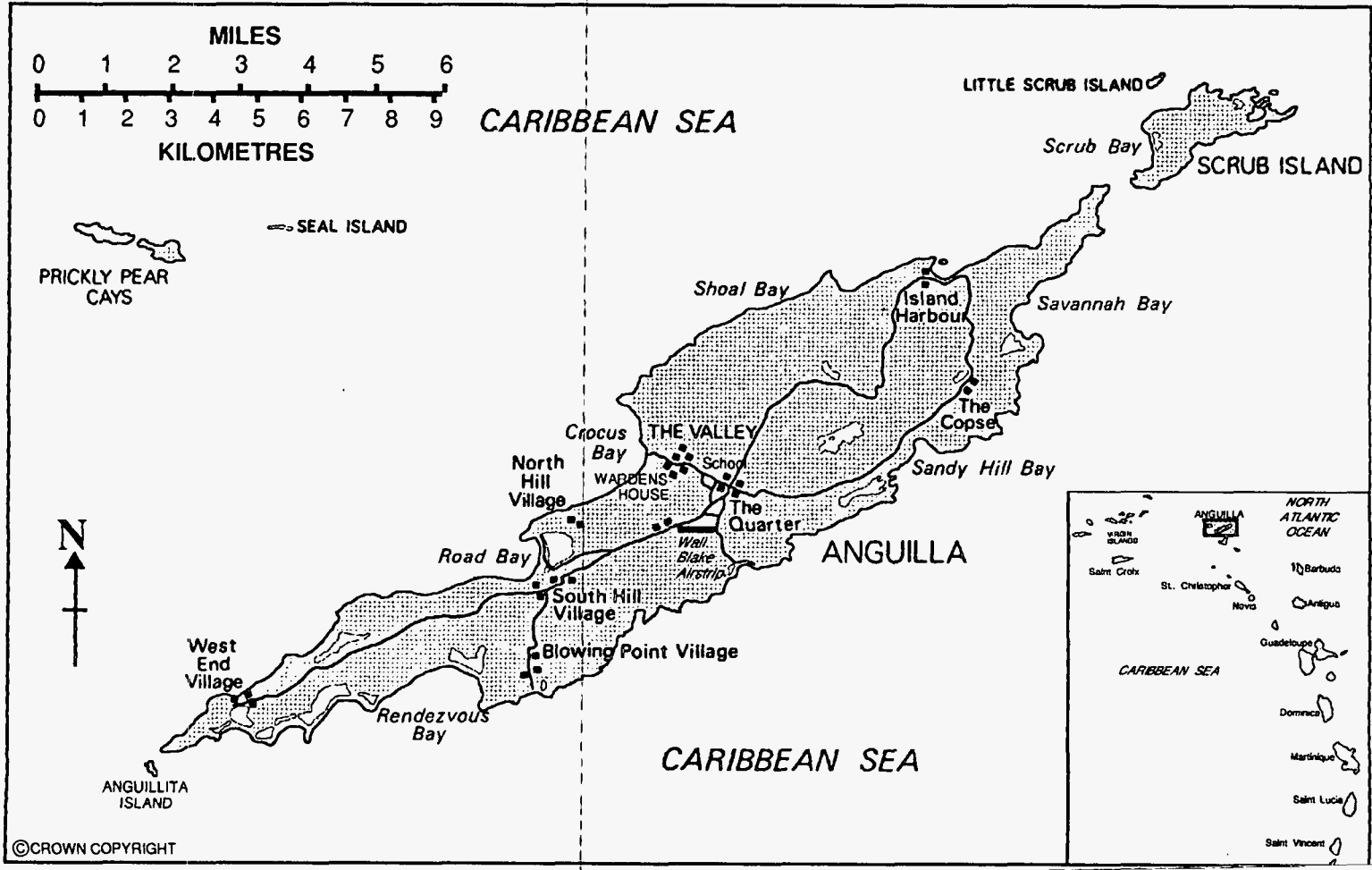

ANGUILLA 1969
MAP 3
MILES
0 1 2 3 4 5 6
0 1 2 3 4 5 6 7 8 9
KILOMETRES
CARIBBEAN SEA
LITTLE SCRUB ISLAND
Scrub Bay
SCRUB ISLAND
SEAL ISLAND
PRICKLY PEAR CAYS
Shoal Bay
Island Harbour
Savannah Bay
The Copse
Crocus Bay
THE VALLEY
School
WARDENS HOUSE
North Hill Village
Sandy Hill Bay
The Quarter
Wall Blake Airstrip
Road Bay
ANGUILLA
South Hill Village
Blowing Point Village
West End Village
Rendezvous Bay
ANGUILLITA ISLAND
CARIBBEAN SEA
N
ANGUILLA
NORTH ATLANTIC OCEAN
VIRGIN ISLANDS
Saint Croix
St. Christopher
Nevis
Barbuda
Antigua
Guadeloupe
CARIBBEAN SEA
Dominica
Martinique
Saint Lucia
Saint Vincent
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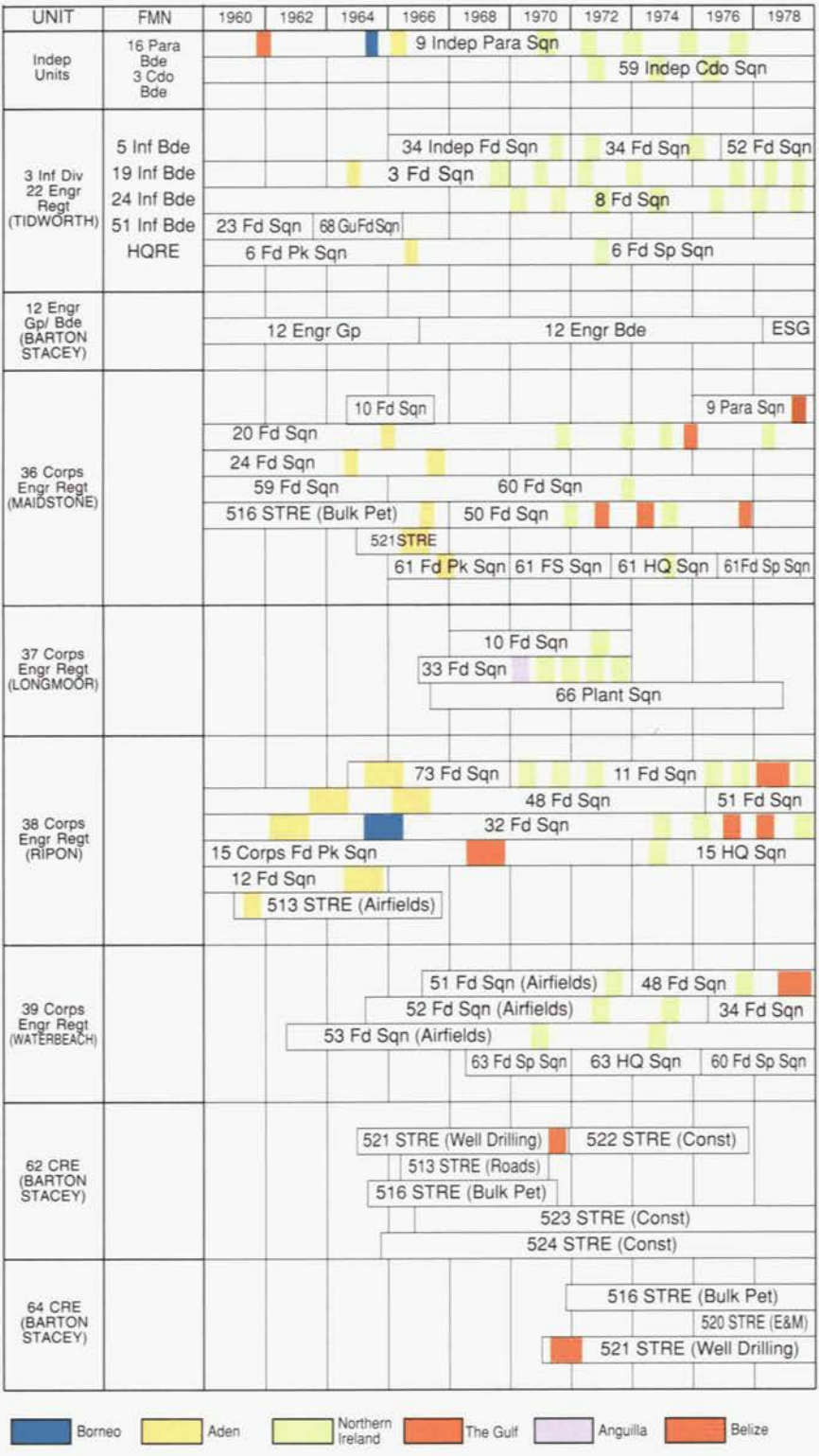
FIGURE 6 UNITED KINGDOM BASED STRATEGIC RESERVE UNITS
Showing major operational deployments overseas



Sir Charles Richardson GCB CBE DSO Chief Royal Engineer
July 1972 - Nov 1977

Centurion AVRE crossing an ARK on exercise in Germany. *(Courtesy Imperial War Museum)*

Centurion Bridgelayer laying a No. 6 Tank Bridge. *(Courtesy Imperial War Museum)*

Centurion AVRE crossing an ARK & A No. 6 Tank Bridge.

Barmine layer

Harrier hide

Combat Engineer Tractor wading ashore

21 Engineer Regiment being granted the Freedom of Nienburg

island until September. After initial work on essential services for their temporary camp in the area of the burnt out Wardens House, they were deployed on the construction of a school at the Valley, including electrical and plumbing installations. With the help of the limited PWD plant available they also carried out some road construction and repair work. After six months a second detachment from 33 Field Squadron relieved the first, accompanied by elements from 66 Plant Squadron, and the parachute company withdrew. The majority of the force on the island were therefore now Royal Engineers and the RE Officer Commanding (Major J D Waymark) became Force Commander Anguilla. During this phase a timber piled jetty was completed at Road Bay and work continued on the school.

In March 1970 33 Field Squadron was relieved by 48 Field Squadron from 38 Field Engineer Regiment. This squadron completed the school including a laboratory block and an extension to a teacher's house in West End. They also constructed a control tower at the airfield and started work on a prison, a library, a warehouse at the jetty and a further school. Whilst 48 Field Squadron were on the island they were joined by 521 Specialist Team RE (Well-drilling). At that time the team formed part of 62 CRE (Construction) based at Barton Stacey in Hampshire. The Specialist Team greatly improved the island's water supply by drilling a total of eight wells, four of which were capable of development; other teams from 62 CRE provided specialist technical advice and undertook the design and planning work for most of the engineer projects.

In September 1970 48 Field Squadron was relieved by a force of reduced size from 52 Field Squadron (Airfields) from 39 Engineer Regiment. This unit completed most of the tasks started by 48 Field Squadron including roads, a roundabout and a library. They also constructed a water pipeline at North Hill and carried out electrification works throughout the island. In March 1971 they in turn were relieved by a detachment from their sister unit 51 Field Squadron (Airfields). By this time the force was being steadily reduced and the unit spent most of its stay preparing for the withdrawal of the military presence from the island in September 1971. They found time, however, to complete Island Harbour School and the electrification works as well as the work on the roads and airstrip. This detachment of 35 men from 51 Squadron and the balance of 25 from other Arms and Services, left the island on 15 September 1971 to

return to the United Kingdom, leaving the Metropolitan Police contingent as the sole British presence. Thus ended a good example of the way in which stability can be restored to an area by a military force when its role is quickly and effectively transformed from policing to the provision of needy local services.

Zimbabwe

An unusual operation for the British Army was its participation in late 1979 and early 1980 in the Commonwealth Cease Fire Monitoring Force in Rhodesia, during its transition into the independent state of Zimbabwe. For years a civil war had been fought intermittently between the security forces and guerillas supporting the opposition Patriotic Front which itself consisted of two wings, ZAPU, who supported Mr Joshua Nkomo, and ZANU, who favoured Mr Robert Mugabe. Agreement was at last reached in 1979 between all the warring factions as a result of prolonged negotiations at Lancaster House in London, which made provision for an amnesty during which all guerillas were to be allowed to gather at nominated Assembly Points, without hindrance from the Security Forces, while arrangements for free elections went ahead. The role of the monitoring force was to observe whether or not the Rhodesian Security Force and the two guerrilla armies were obeying the ceasefire. It was not strictly a peacekeeping force though it was hoped its presence would ensure that the rival forces were contained until the elections were over and a single, unified national Zimbabwe Security Force could be established.

In order to maintain the momentum once political agreement had been achieved in London, the monitoring force had to be set up extremely quickly with little time for detailed planning. Consequently, the composition, task and administrative arrangements were subject to continual change in the early stages. Nevertheless, the first troops arrived on schedule in Rhodesia on 8 December 1979 to form the advance party, finalise the deployment plan and make the necessary reception arrangements for a main body which was to total some 1,400 all ranks, mainly from the United Kingdom but also including Australian and New Zealand Army contingents.

The Royal Engineer contingent was led by Lieut Colonel F G Sugden and was a composite force drawn from HQ 8 Field

Force (one officer), 22 Engineer Regiment (the Commanding Officer, two officers and 13 other ranks), 36 Engineer Regiment (three officers and 16 other ranks), 38 Engineer Regiment (one officer and two other ranks), 51 Field Squadron (one officer and two other ranks), 53 Field Squadron (five other ranks), 9 Parachute Squadron (two other ranks) and two other ranks of the Postal and Courier Communications Unit.

As troops were to be deployed in small detachments throughout the length and breadth of a country over twice the size of England, with poor communications and in formidable weather conditions, the initial deployment was not without its problems. In some cases the RAF flew Hercules to land teams on airstrips which had had only cursory preliminary reconnaissance and could not be guaranteed to be fully free from mines. Nevertheless, by the end of December some twenty two rendezvous had been established in carefully chosen and publicised locations to which guerrillas had been exhorted by their leaders to report. As soon as possible thereafter they were to be taken by requisitioned bus to one of the sixteen assembly points - a hazardous journey in itself - with the ever present threat of ambush on the way.

Against all expectations over twenty thousand guerrillas emerged out of the bush during the allotted period from 28 December 1979 to 4 January 1980; this influx created an immediate logistic headache for the monitoring force because the Rhodesian administration had not anticipated a response of this magnitude. Not only were the Commonwealth troops vastly outnumbered but they faced a huge problem in diplomacy by continually having to defuse confrontations between rival factions. These viewed each other with suspicion and would, on the slightest provocation, seize any opportunity to settle old scores. The Commonwealth troops had also to mount a major airlift of food, clothing, tentage and water supply equipment into the assembly areas and distribute it impartially to all concerned.

Thereafter, until the elections were over, a brittle routine became established in the camps with muster parades every morning, strict discipline - sometimes actively encouraged by guerrillas wishing to demonstrate their military efficiency - and sport. The artisan trade skills of the Sappers were put to good use in general camp improvements, and there were short Rest and Recuperation breaks arranged for the troops to enable them to visit such sights as the Victoria Falls and Kariba Dam.

Towards the end of February joint patrolling started and early in March strenuous efforts were made to integrate selected ZAPU and ZANU units into a new Zimbabwe Army. Mr Mugabe's victory in the election was greeted by jubilation in the camps and apprehension by the Rhodesian Security Forces but there was remarkably little violence. By 10 March 1980 the Commonwealth Force had handed over and finally withdrew. Thus ended a short, sharp, peace-keeping mission of which the British Army can be justly proud.

PROJECTS

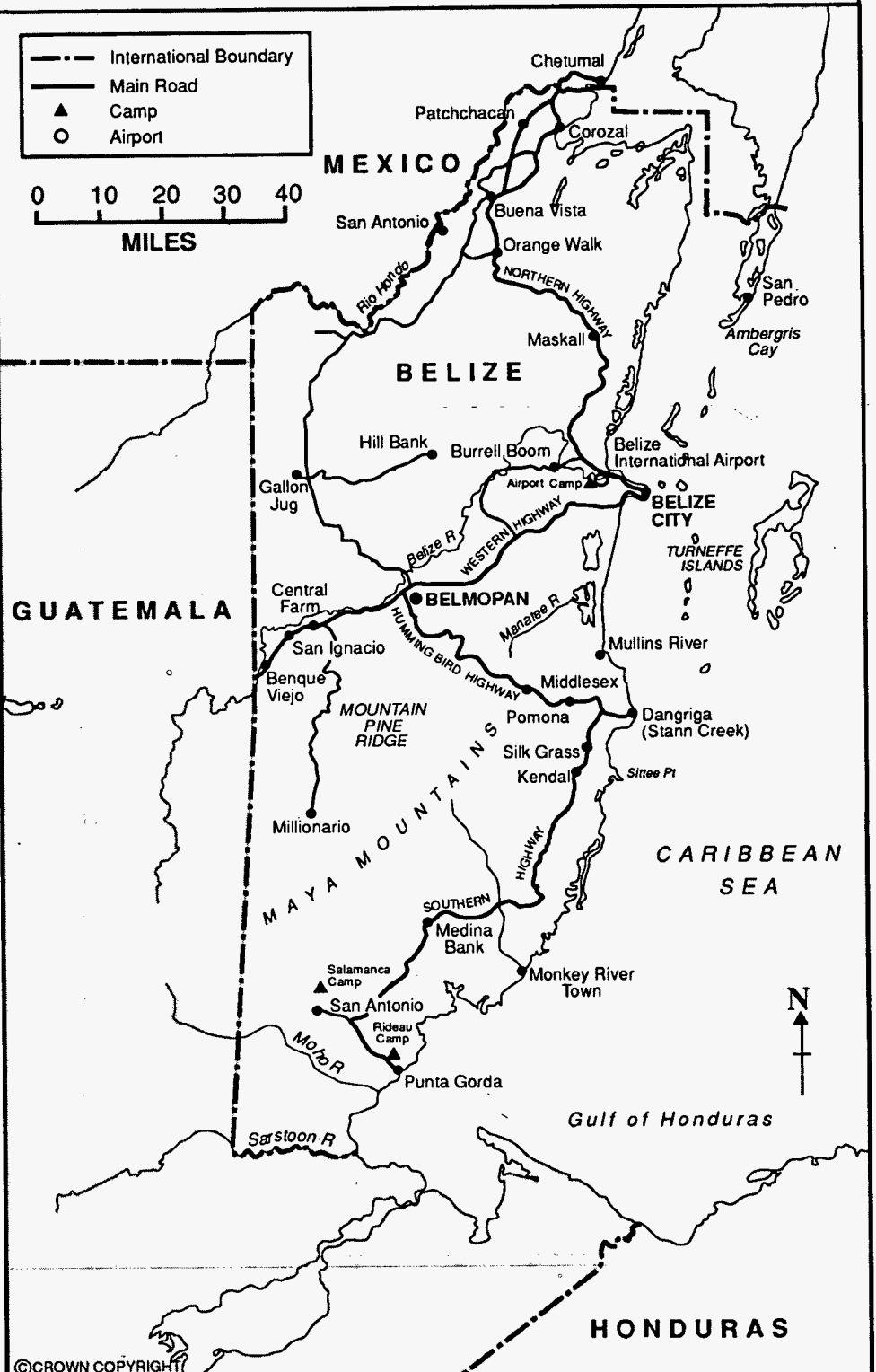
Belize (formerly British Honduras)

For some years there had been a small British Army garrison in Belize which in 1961 consisted of an infantry company from the battalion based in Jamaica. But it was not any territorial threat from a nearby neighbour which precipitated major RE participation in the colony in that year, but a dramatic onslaught by the weather. Early on 31 October Hurricane Hattie, raging for nearly eight hours with winds of up to 200 miles per hour and followed by tidal waves twelve feet high in the coastal areas, lashed a strip of the country 50 miles wide including the towns of Belize and Stann Creek. On 3 November 38 Engineer Regiment were instructed to emplane an advance party at Lyneham at first light the next day, load 17,000 lbs of stores on a freight aircraft in the morning at London Airport and fly out a composite squadron group. 12 Field Squadron (Major J A Notley) were selected and despite not returning to barracks from their annual range course until 1600 hours on 3 November 1961 by 0100 hours the following day their stores were on their way and the advance party had left.

The country itself was little larger than Wales and had a population of 150,000. On arrival it was found that virtually no transport or plant could be made available for engineer purposes because of severe losses from wind and wave. With the aid of a few requisitioned cars and trucks and six small marsh buggies and trailers, and the tools brought from UK, a mass of work was tackled in the next three weeks. Plant and vehicles, bought "off the peg" from civilian sources in Jamaica then arrived by sea after an agonising week aground on a sand bank eleven miles off shore.

BELIZE 1980

MAP 4



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From the start a joint task force was established with the PWD consisting of Clerks of Works and NCOs supported by sapper tradesmen. Their work included:

major repairs to the airfield dispersal runway;

temporary roofing of the main power station;

rehabilitation of hospital wards and associated power and water systems;

innumerable roof repairs;

the running of a major water point using US Army equipment and help with the repair of drowned PWD vehicles and plant.

After the first week, with the deployment of progressively more Sappers, work spread further afield to include the construction of a large temporary hutted camp for up to 5,000 homeless at Milestone 16 out of Belize on the main road to the west. A second weak troop was established at Stann Creek to rebuild a deep water jetty, provide a water point and, later, to install water, electricity and camp structures for a temporary township inland for a further thousand people. With the arrival of plant and tippers from Jamaica capacity increased enormously. By the second week in December 250 tons of street debris in Belize was being removed daily - a task similar to that of clearing streets blocked after a nuclear burst.

Operation Hurricane Hattie provided a striking example of the way a strategic reserve unit needed to be ready to move by air to far away places at almost no notice and, once there, the traditional need to make bricks without straw was amply demonstrated. Once the urgent tasks had been completed the troops withdrew, but the aftermath of the hurricane had left Airport Camp, nine miles outside the city of Belize and what had hitherto been the garrison's base, in a sorry state. Plans were therefore made for its rebuilding and in August 1962 a reinforced troop of 20 Field Squadron was flown out to start the work.

Very little of the original accommodation remained; temporary wooden huts served as sleeping quarters, messes and offices for the infantry company forming the garrison, so reconstruction included the building of barrack blocks, officers and sergeants messes, offices. a guard room and ten married quarters, amounting to a total of forty four buildings.

The troop employed up to 160 local civilians and at times the standby platoon from the resident infantry company, but work was hampered by the shortage of local tradesmen and the very limited facilities for offloading, moving and handling the large quantity of stores involved. Despite all these drawbacks the work was completed as planned and the troop withdrew in December.

For the next few years the garrison returned to company size and the sapper commitment was small, but increasing political tension nevertheless prevailed. For many years the country's boundaries had been disputed by its much larger neighbour Guatemala and, as the independence of the colony approached, these claims were renewed with increasing vigour. By 1968 the British Government had recognised the need for a stronger military presence and thereafter a field troop from the UK was normally stationed there for a six month tour.

In 1972, as plans to increase the British garrison further were made, a composite force under OC 10 Field Squadron with a troop each from 10 and 34 Field Squadrons, a planning team from 62 CRE, and the troop from 60 Field Squadron already in Belize, assembled to carry out works in advance for the reinforcements. One task was to enlarge Airport Camp, erecting Nissen and Romney huts and to construct Bofors gun sites there; the other was to construct with Nissen huts a company camp at Central Farm, subsequently known as Holdfast Camp, in the west near the Guatemalan border. A smaller task was to build a platoon locality at San Ignacio. The composite force completed these tasks and returned to the UK in August 1972 and the roulement troop from 60 Field Squadron was relieved by one from 11 Field Squadron.

The colony gained independence as Belize in 1973 but the external threat remained and the new government requested that the British troops remain. In 1975 a forestry camp was taken over by the garrison and, after improving it with Nissen huts and helicopter pads, it was named Salamanca Camp. By 1976 weapon training ranges and an adventure training centre had been built and operational tasks such as the extension of

defensive positions and the provision of blast walls to protect the newly arrived Harrier aircraft continued.

In 1977 plans were made for the construction of a 160 man camp near Punta Gorda and work was begun by the resident field troop from 3 Field Squadron in October. By this time the garrison had built up to two battalions with supporting arms and services. In December a strong detachment from 15 HQ Squadron of 38 Engineer Regiment joined the troop and together they built a tented camp for 32 Field Squadron which was to build the semi-permanent 160 man camp to be known as Rideau Camp.[2] Nissen huts, five concrete block buildings, a Romney hut, some other buildings and associated services and roads were built and completed by July 1978. For a time, until January 1979, Royal Engineer support reverted to a single roulement troop provided by 53 Field Squadron (Construction) but on 25 January 1979 the force level was raised again and 9 Parachute Squadron was flown out for a six month tour, followed in July 1979 by 48 Field Squadron, and for the remainder of the decade the British Army commitment continued (*see* Table 6).

Turks and Caicos Islands

It was to these colonial islands, lying between the Bahamas and Haiti, that 15 Field Support Squadron was deployed for the first four months of 1970. Their purpose was to carry out a series of Military Aid to the Civil Community (MACC) tasks including the overhaul of the main power station, water tank construction, road building, telephone installation and various diving tasks such as blasting coral reefs for which the RAF provided some additional personnel. Exercise Cossack, as the venture was named, provided an excellent example of the problems encountered when a unit is deployed to an area where very little can be procured locally and the tempo of life of the indigenous population is relaxed, to say the least. Thus, most of the carefully prepared stores were delivered by sea to Grand Turk for transhipment onward to South Caicos. Reliance on local civilian resources for the handling and security of the stores, which included rations and explosives, proved most unsatisfactory and by the time direct military intervention in the form of protestations by the sapper officer in charge took place at the damage being done to the cargo, certain of the local workforce

had become truculent and inebriated and a strike ensued. Notwithstanding these tribulations, the great majority of the tasks the squadron had set out to do were completed to the satisfaction of all concerned.

Honduras

As with the other dependent territories in the Caribbean, Honduras was regularly vulnerable to the ravages of tropical storms and in 1974 the state was struck by Hurricane Fifi. Though the damage inflicted was appreciably less than that suffered by its neighbour, Belize, as recounted earlier, the British Government responded by donating Extra Widened Bailey bridging which could temporarily restore local communications. A team of five all ranks, under Major R G Osborn of 62 CRE, supervised the construction of two 400 foot and one 100 foot bridges and their contribution was warmly appreciated.

Dominica

Similarly, on 29 August 1979, Dominica, the northernmost of the Windward Islands in the West Indies, was struck by Hurricane David, possibly the worst it had experienced for two or three hundred years. Winds of 140 mph gusting to 200 mph over a period of eight hours devastated the island, damaging or destroying 75% of the housing and leaving citrus and coconut plantations ruined. Torrential rains added to the damage and caused several landslips. Immediate relief was provided by HMS *Fife*, a guided missile destroyer, augmented over the next few days by small teams from France and USA, but it was appreciated that something more substantial was required for the longer term. Accordingly, Project Illuminate was mounted by UK to deploy Royal Engineers to provide some of the management and technical skills that were lacking. After an initial reconnaissance in October by Major J B Bennett, OC 52 Field Squadron (Construction) who happened to be nearby in Belize, a team of 11 all ranks from 22 Engineer Regiment under an E&MO from 64 CRE went out to Dominica in November to refurbish the mains water supply. They were followed in January for three months by a reinforced troop from 8 Field Squadron to repair buildings and the sea defences, and to re-erect the electricity power lines and distribution systems. Their work was continued in April by another troop from the same squadron who also stayed for three months. As an interesting aside, Major

M G Fossey, OC 8 Field Squadron at the time, comments in his official report that the whole project provided excellent training for a unit which, at that time, was earmarked for Home Defence and whose role therefore included possible post nuclear strike operations.

Falkland Islands

In the 1970s, long before the existence of these islands became widely known because of the dispute between Britain and Argentina over their sovereignty, a series of reconnaissances were carried out on the Falkland Islands by 62 CRE and CRE (Airfields) staff. Their main purposes were to study the possibility of an aerodrome being constructed on East Falkland Island, and to suggest improvements to the Royal Marine accommodation at Moody Brook Camp. Though not the concern of this volume, much of the information gleaned by these activities provided valuable intelligence when the Falklands conflict suddenly erupted in 1982.

St Helena

Between September 1978 and December 1979 a series of tasks, known collectively as Project Bonaparte, was carried out on the remote island of St Helena, sponsored by the Foreign and Commonwealth Office. The work was carried out by a small team from 64 CRE (Electrical and Mechanical), averaging eight all ranks, many of whom were accompanied by their families. The tasks included the construction of water treatment plants, a public swimming pool and a commercial quarry, together with assistance to the PWD with improvements to the island's power supply.

Ethiopia

In the early years of this period relations between this Kingdom and Britain were warm and any opportunities for enhancing them which would offer useful training were welcome. Thus, in the spring of 1972 the whole of 15 Field Support Squadron went out to improve a 50 kilometre stretch of road by constructing culverts, causeways and three Bailey bridges. A troop was also detached to construct a 700 foot power driven aerial ropeway across a remote section of the Blue Nile gorge for use by leprosy control officers otherwise faced with a five day

detour on foot or mule. The squadron, which was supported by an Ethiopian sapper company, also completed various small tasks elsewhere for the local community. Because of the distances involved and the inaccessibility of some of the projects, the squadron was supported by detachments from the Army Air Corps and all tasks had to be completed during the dry weather months. Two years later, in response to a request for help following the droughts in the Wollo Province in the previous two years, a team from 524 Specialist Team, supported by AAC helicopters, were deployed. A system of minor roads was badly needed in the area which would allow food, relief and medical supplies to be delivered quickly into locations threatened by famine and which could also be used for the export of grain in good years when rain was plentiful and surplus crops had grown.

It was decided that, as far as possible, food distribution on this occasion should be in exchange for work, rather than provided simply as a humanitarian gift. The construction of elementary roads, therefore, by labour intensive methods was considered to be a suitable expedient in the "food for work" programme as it would not only improve the local infrastructure but raise the people's morale. In the event, 130 kilometres of road were constructed and, at its peak, 10,000 labourers were employed, spread over five different sites, between January and April 1974. A high profile project of this nature inevitably attracted the eyes of the world and the team were not only visited at work by British television crews but personally thanked by the Emperor himself.

Malawi

51 Field Squadron (Airfields) spent four months in 1972 in North West Malawi, preparing 27 miles of road (including 4½ miles down an escarpment) to help open up the border area adjacent to Zambia. This was an example of a case where much help was provided by the local military, the Malawi army. By supplying men for local defence, some air supply, radio communications, loan vehicles and even assault pioneers as working numbers, the sapper squadron was relieved of much administration and could concentrate on engineering matters.

Sudan

Under rather different conditions of terrain, 32 Field Squadron went to the Sudan in December 1973. The aim of the project

this time was to improve communications in the troubled south which had been damaged during the protracted civil war. Two badly worn reinforced concrete bridges at Tonj and Ringasi, seven hundred miles from the Zaire border, were built to exacting standards under pressure of time during three very hot months, with the assistance of two companies of Sudanese Engineers. Their joint efforts were duly rewarded as the project was opened[3] by the Vice-President of Sudan and President Numeiry honoured the squadron by collectively awarding it the Sudanese Order of Merit.

Botswana

Since its formation in 1965, 521 (Well Drilling) Specialist Team had been deployed to various countries and in late 1975 was due to go to Ethiopia. The commitment, however, was cancelled and, as a formal request had been received in London six months earlier for RE assistance in Botswana, the venue was changed accordingly. At this time the main road north west from the capital Gaborone into Kalahari was being improved and water was required for the surfacing and associated civil engineering works on the section to Molepolole. At the same time it was hoped the team would be able to develop wells for some of the adjacent villages and to train local drillers. Prior to the team's arrival in Botswana in August potential drilling sites had been selected by the local geological survey department. As was to be expected, some of the drillings were unsuccessful either because of geological failings or problems with the equipment. Nevertheless, by the time the team returned in late November, they had successfully handed over four wells on the road project and two wells for the local village community, using two trailer mounted percussion rigs, an RB60 and a Mangold, and a dozen local trainees had greatly profited from their integration in the sapper team.

Rodrigues

In November 1976, a British team sponsored by the Ministry of Overseas Development visited Rodrigues, an island dependency of Mauritius, to establish the possibilities for UK Aid Assistance. One of the team's recommendations was that the Ministry should offer to survey the route of a proposed road, using the services of the Royal Engineers. The recommendations were

accepted and after an initial reconnaissance by Lieut Colonel L J Kennedy later that year, a team from 62 CRE was deployed to carry out the detailed survey and design of 7.1 kilometres of new coast road between Oyster Bay and La Ferme and the preparation of a draft contract for its subsequent construction by local labour.

Christmas Island

In a previous volume the story of the Corps involvement in the nuclear test programme on Christmas Island prior to 1960 is told. By May of that year the Task Group on the island had been disbanded and the only remaining unit was 73 (Christmas Island) Squadron assuming a care and maintenance role of the site and such equipment as had not been backloaded. During 1961, however, as Russian nuclear tests continued, the UK Government agreed to make the island available to the US Government and on 16 February 1962 an official Memorandum was signed between them to this effect. Within days of the signing the first American contractors arrived and over the next two months, with characteristic speed, 80,000 tons of stores were delivered by sea and air and the base reactivated to accommodate some four thousand scientists, civilian contractors and military, under the title Operation Dominic. Over a period of ten weeks during the summer the Americans detonated 23 nuclear devices, but even as they did so international pressure for the halting of such trials was growing. In 1963 a Test ban Treaty was signed between the major powers and by September the Americans had left the island once more. To preserve the site for any further possible use, however, 20 Field Squadron and 516 STRE (Bulk Petroleum) were flown out from UK in December to join 73 Squadron to maintain the facilities on an active basis. But shortly afterwards the British Government decided that there would be no further requirement for the base and such equipment as was not handed over to the Gilbertese community was placed in preservation. Finally, after nearly seven years continuous service on the site, 73 Field Squadron flew home to disband, while 20 Field Squadron and 516 STRE rejoined the UK Strategic Reserve.

Pitcairn Island

Over the period May 1976 to February 1977, a management

team for 62 CRE (Construction) under Capt H A Cowan carried out several works on Pitcairn Island under the title Operation Pallium for the Foreign and Commonwealth Office. The main task was the construction of a new jetty, underwater blasting to provide an approach channel and associated road reconstruction and building repairs at the harbour.

Saudi Arabia National Guard

There were many occasions when Works projects were undertaken but the majority were small and seldom above squadron level. Major opportunities for professionally qualified officers to gain practical experience were therefore always sought particularly in the mid 1970s when such work in Malta, described in Chapter VIII, was clearly coming to an end. Thus, when the Saudi Arabia National Guard (SANG) asked for a team to assist them with the supervision of two major hospital construction projects, the chance was taken gladly. The RE team formed in March 1977 within the British Military Mission, and its composition varied with the work load but peaked at about 20 strong. The team included professionally qualified officers under a brigadier or colonel, a garrison engineer, clerks of works and an administrative officer. They were expected to advise SANG on all aspects of the design and construction of the hospitals, which was being carried out as a turnkey operation by a Belgian consortium called Eurosystem Hospitaliers, with whom the contract had been placed before the team arrived. They had no authority to stop or change work and therefore suffered many frustrations, but in practice could often persuade the Consortium to change things which were manifestly wrong without resorting to formal instructions from SANG.

The team was based in Riyadh where a 500 bed hospital and palace complex were being built. In Jeddah they had a Resident Engineer and smaller team for the 300 bed hospital constructed to a design similar to that at Riyadh but taking account of a greater seismic threat. This project lagged that at Riyadh by about six months. Following the completion of both hospitals in 1982, SANG let a contract to the MOD for the operation of that at Jeddah and a new team was established to supervise a back to back contract with a British health care firm. There was a strong Sapper presence in this team too with a Colonel Deputy Commander, Lieut Colonel Technical Adviser, a Garrison

Engineer and two Clerks of Works. This RE involvement reduced in 1986 with the termination of the MOD contract and ended in 1988.

EXERCISES

Introduction

Throughout the period it became increasingly difficult for Strategic Reserve units to carry out formation training within the training areas available in the United Kingdom, where such training required widespread mobility and dispersion. The training areas available to NATO, and especially BAOR, in Central Europe were fully used and not readily available to the UK Strategic Reserve, even after its priority role changed to that of reinforcing 1 British Corps. The British Army looked for alternatives and from time to time opportunities arose, usually in Canada, but sometimes also elsewhere, such as in the United States and Australia, for overseas training sites to be used.

Canada

In 1961, for the first time since Canada became self-governing, a British unit crossed the Atlantic to train in Canada on exercise Pond Jump. The British infantry battalion concerned participated in a concentration of the three home based Canadian brigade groups in what was, by British standards, the large training area of Camp Gagetown, New Brunswick. This initial venture was a great success, but it also demonstrated that a great deal of work needed to be done to open up the forest and swamp areas if mobility and dispersion were to be practised in anything approaching a Central European scenario. During the exercise it was suggested that a British field squadron might be invited another year to take part and carry out development work in the training area at the same time, and this was duly agreed.

Thus, in 1963, 24 Field Squadron (Major P Moore), the SME Demonstration Squadron, went to the area in May and June and built a 100 foot improvised bridge, 2800 metres of all weather road and 2500 metres of one-way track. Their work was undoubtedly most successful and set the pattern for a series of exercises that continued beyond 1980 and became known collectively as Waterleap. They all took place either at Gagetown, the home of the Canadian Army School of Military

Engineering or at Valcartier, Quebec. The earlier exercises involved projects that could be completed by the squadron during the two to three months of its visit, but later more ambitious schemes were undertaken. In 1975 a scheme was prepared to build a road through the training area of Petawawa where the terrain was hilly, covered with forest, with granite outcrops and many surface boulders. 53 Field Squadron (Airfields) began in 1976 by constructing 8.9 kilometres of the road. The next phase was to continue the road around the southern boundary of the training area and this involved bridging a tributary of the River Petawawa. The chosen design for the 207 foot bridge incorporated two spans, to be built of steel beams and reinforced concrete onto a central concrete pier. The approach roads were to be all weather two way roads capable of carrying tracked vehicles. In 1977 9 Parachute Squadron constructed the abutments and began the pier and the following year 52 Field Squadron (Construction) were due to erect the spans. However, they were frustrated by a strike at the steel works preventing delivery of the beams and so, instead of completing the bridge, they built two 3.0 kilometre sections of the main supply route. The bridge was finally and successfully completed by 51 Field Squadron (Construction) between June and October 1979, and the route duly opened.

Elsewhere

On a few occasions whole units exercised abroad, either alongside other nations on their home ground or in direct exchange with their units. For example, in 1973, 59 Commando Squadron trained in Kansas with their American counterparts, building a breakwater and carrying out sundry roadworks. And from April to June 1979 3 Field Squadron exchanged continents with 18 Field Squadron Royal Australian Engineers in Exercise Southern Cross/Pole Star. Such occasions provided valuable experience for all ranks involved but such moves of whole squadrons, as far as United Kingdom based units were concerned, were rare.

FOOTNOTES TO CHAPTER V

1. This was the first opportunity the recently constituted HQ Strategic Command in UK had had to mount an overseas operation for real, and it

seized it with gusto, much to the chagrin of those taking part in the landings, who felt their every move was being directed by the entire staff at Wilton. Watchers on the frigates were concerned to see flashes ashore as the troops landed, but the assault was in fact virtually unopposed - it subsequently transpired that the observers had merely spotted the flashbulbs of the press corps.

2. The name "Rideau" was adopted in recognition of the part played in the construction of the camp by 15 Squadron who 150 years earlier had worked on the canal of that name in Canada.

3. For the opening ceremony the Sudanese were insistent that a cow should be slaughtered on the spotless new bridge deck, but the squadron commander Major A G Merrifield managed to persuade them to hold the sacrifice on the village square instead. Lieut Colonel J M Bickford, who took part in the original reconnaissance and accompanied the squadron when the tasks were carried out, also recalls that the hazards of working in such locations included having the dubious duty as senior guest at an official party of partnering the local brigadier in the tango in order to start the party off, and of being a passenger in a Beaver light aircraft while a loose chicken fluttered round the cockpit controls.

TABLE 6. ROULEMENT UNITS IN SUPPORT OF BELIZE GARRISON

1 Feb 72 - 21 Mar 72	Tp 34 Fd Sqn
21 Mar 72 - 25 Aug 72	Tp 60 Fd Sqn
22 Aug 72 - 27 Feb 73	Tp 11 Fd Sqn
27 Feb 73 - 26 Aug 73	Tp 50 Fd Sqn
26 Aug 73 - 19 Feb 74	Tp 51 Fd Sqn (Airfds)
19 Feb 74 - Aug 74	Tp 48 Fd Sqn
Aug 74 - 11 Feb 75	Tp 60 Fd Sqn
11 Feb 75 - 31 Aug 75	Tp 53 Fd Sqn (Airfds)
1 Sep 75 - 12 Feb 76	Tp 20 Fd Sqn
7 Nov 75 - 12 Jan 76	Sec 32 Fd Sqn
12 Jan 76 - 12 Feb 76	Sec 20 Fd Sqn
12 Feb 76 - 22 Aug 76	Tp 32 Fd Sqn
20 Aug 76 - 19 Feb 77	Tp 50 Fd Sqn
19 Feb 77 - 7 Aug 77	Tp 11 Fd Sqn
7 Aug 77 - 9 Feb 78	Tp 3 Fd Sqn
9 Feb 78 - Jul 78	32 Fd Sqn
Jul 78 - 25 Jan 79	Tp 53 Fd Sqn (Const)
25 Jan 79 - 16 Jul 79	9 Para Sqn
16 Jul 79 - 21 Jan 80	48 Fd Sqn
21 Jan 80 - 16 Jul 80	52 Fd Sqn (Const)

CHAPTER VI

THE FAR EAST

THE CURTAIN COMES DOWN

POLITICAL BACKGROUND - COMMAND AND ORGANIZATION - GHQ FARELF - Singapore - Malaya - Hong Kong - MALAYA - Terendak Cantonment - Bukit Mendi Project - Floods in Johore - Kulai Road Project — Exercise Bersatu Padu - BRUNEI AND BORNEO - Kota Belud Training Area — Revolt in Brunei - Indonesian Confrontation - Works Services in Borneo — Borneo after Confrontation - THAILAND - Operation Crown - Post Crown Project - Other Projects - HONG KONG - Operations - Projects - Disaster Relief - GILBERT AND ELLICE ISLANDS - Coral Reefs - Airfield Construction — SOLOMON ISLANDS - PAKISTAN - VALEDICTION.

POLITICAL BACKGROUND

British military activities in the Far East between 1959 and 1971 were to a large extent influenced by the South-East Asia Treaty Organization (SEATO) created by the Manila Pact of 1954. This pact, signed by representatives of Australia, France, New Zealand, Pakistan, the Philippines, Thailand, the United Kingdom and the USA, committed the signatories to collective defence responsibilities in the Treaty Area. Subsequently, Pakistan withdrew in 1963 and France ceased to participate in the Organization after 1967. The Organization itself was disbanded on 30 June 1977.

Meanwhile, continuing internal struggles for power in the former French colonies of Indo-China led from 1962 onwards to American intervention, which escalated into the Vietnam War. No British troops were engaged in the war in Vietnam, but the Commonwealth was represented there by an Australian contingent symptomatic of a growing involvement of that country, as of New Zealand, in the affairs of South-East Asia. The ensuing hostilities had repercussions throughout the Far East and generated opportunities for SEATO support to Thailand in which Royal Engineers had a part to play.

In Malaya the Emergency, which had dominated the political and military scene since 1948, was on 1 August 1960 declared at an end, and this allowed the Army to turn its thoughts from guerrillas and the jungle to training for other forms of warfare. In furtherance of de-colonization, the British and Malayan Governments agreed on an enlargement of the Federation to include, with effect from 16 September 1963, the former Crown Colonies of North Borneo (Sabah), Sarawak and Singapore, and from that date the name of Malaysia was taken into use. Brunei opted out from this arrangement and continued as an independent Sultanate under British protection. On 9 August 1965 Singapore seceded from the Federation and established itself as a Republic within the Commonwealth.

Indonesia (formerly the Dutch East Indies) pursued in the meantime a programme of nationalist aggrandizement under the leadership of President Sukarno, in the course of which Western New Guinea (Irian Jaya) was absorbed (1963). At the same time resistance hardened to the evolution of Malaysia, and there ensued the revolt in Brunei (December 1962) and so called "Confrontation" in Borneo (1963 - 1966).

Faced simultaneously with severe economic difficulties at home, the Labour Government in a White Paper presented to Parliament in July 1967 reaffirmed its intention to concentrate Britain's defence effort in Europe and to disengage as quickly as convenient from its commitments East of Suez. In consequence, the Royal Navy dockyard in Singapore was handed over to the new Republic in December 1968, while planning started for all British Forces to be withdrawn both from Malaysia and from Singapore in 1970-71. On 18 June 1970, however, a Conservative Government was returned to power in Whitehall committed to the retention in the Far East of a "modest presence", which as far as the Army was concerned amounted to a Commonwealth (ANZUK) Brigade and associated Support Group, in which the Royal Engineers would contribute a field troop for the ANZUK Engineer Squadron as well as a Postal & Courier Communications Unit.

Through all this Hong Kong pursued its progressive course to becoming the last surviving British Crown Colony in Asia. With the evacuation of Singapore in 1971, Hong Kong became once more the principal symbol of the British presence in the Far East and the home station of the Brigade of Gurkhas, including the Gurkha Engineers.

COMMAND AND ORGANIZATION

GHQ FARELF

British Forces of all three Services were, with effect from 28 November 1962, brought for the first time under a single Commander-in-Chief Far East Command (CINCFE) located in Singapore. Within this Command, GHQ Far East Land Forces (FARELF) continued as before to direct and administer all Army units and establishments through the following sub-commands:

Singapore Base District
Malaya District/Area
(Overseas & Commonwealth Land Forces (OCLF)/17 Gurkha Division)
Land Forces, Hong Kong
British Gurkhas (India)
(BG (Nepal) from October 1960)

A major reorganization of the engineer order of battle took place in 1960 and 1961, during the course of which 74 Field Park Squadron was disbanded and replaced by 70(Gurkha) Field Park Squadron, 84 Field Survey Squadron and 570 Map Reproduction Troop coalesced under the title of 84 Survey Squadron, and the Singapore Engineer Regiment was broken up. The resulting Order of Battle is shown at Figure 8. There followed the dissolution of the last of the Malayan Royal Engineers and the formation of a Singapore Engineer Squadron. 59 Field Squadron arrived in January 1964 to take part in Operation Crown and remained in FARELF to the end. On the creation in 1965 of the Royal Corps of Transport (RCT), 10 Port Squadron and the several Movement Control detachments in the theatre were disbanded. 51 Field Squadron (Airfields) came on the scene in 1966 on the transfer to the Corps from the Royal Air Force of responsibility for airfield construction and maintenance, and an RE Air Troop (FARELF) was raised in 1966.

By September 1960 work on the depot for the Brigade of Gurkhas in Nepal had sufficiently progressed for the HQ to move from Calcutta to Dharan and the old headquarters and transit camp at Barrackpore were then restored to the Government of India. In this exodus the Garrison Engineer, Barrackpore, had the distinction of being the last in a long line of

Royal Engineers to have served in Hindustan, stretching back to 1747, when the Corps made its first appearance there with Admiral Boscawen's ill-fated attempt on Pondicherry (see Vol I page 164). With the current contracts at Dharan completed, the Establishment of CRE was in April 1961 reduced to that of a DCRE, comprising four officers and six senior other ranks. In 1965, the Movement Control Section went over to the Royal Corps of Transport. By then the DCRE at Dharan had become Area Officer of the Ministry of Public Buildings and Works (MPBW), later the Department of the Environment Property Services Agency (PSA); and, by 1971, he was responsible to the Regional Director in Hong Kong for all British Government works services in Nepal.

With the end of the Malayan Emergency in sight economy in British Service manpower promptly reasserted itself as a dominant factor. However, the overall Gurkha manpower "ceiling" was raised with the result that by 1966 the Gurkha Engineers, with an establishment not far short of 1400, represented one-tenth of the entire Regular strength of the Corps of Royal Engineers: but this happy situation was not destined long to endure. By the time that Regiment reassembled in Hong Kong in 1970 it mustered RHQ and two field squadrons only.

In the same year began the run-out, signalled by the disbandment in February of HQ Malaya District; in December the Survey branch from GHQ Singapore was transferred to Hong Kong, by then an independent command. The post of Chief Engineer FARELF, downgraded from Brigadier to Colonel on 1 November 1969, was disestablished on 31 May 1971, and on 31 October Far East Land Forces ceased to exist.

Singapore

With effect from 1 August 1960, the appointment of Chief Engineer of the District was discontinued and replaced by a Commander (Colonel) Engineer Base Group and the post of CRE (Works) Singapore was abolished.

In the accompanying reorganization, the Singapore Engineer Regiment was dissolved and its remaining sub-units placed under the Engineer Base Installation (EBI). To handle the massive and mounting load of repair and major overhaul of plant associated with the rundown, a REME unit

was affiliated to EBI, styled Engineer 'C' Vehicle Workshop, to which was attached a number of RE fitters.

When, in 1963, 75 (Malayan) Squadron was disbanded not all of its men went to join the ranks of the swelling Federation (later Malaysian) Engineers. A residue of locally domiciled tradesmen was assembled in Singapore in a Construction Troop, absorbed later into Headquarter Squadron, Engineer Base Group, and subsequently expanded to form the Singapore Engineer Squadron.

In 1968 EBI and 304 ESBD became Far East (sometimes FARELF) Engineer Park; renamed simply Engineer Workshops, EBW preserved for a while longer a separate identity. HQ Engineer Group Singapore continued to exercise command over all RE units and establishments in the District until, on 1 November 1969, the Headquarters was reduced and the units were regrouped in three lieutenant-colonels' commands as follows:

FARELF Engineer Park
- Engineer Stores Park
- Engineer Workshops
- Engineer Plant Park
- Attached:
  - Engineer 'C' Vehicle Workshops REME

63 CRE (Construction)
- 522 STRE
- STRE Thailand
- STRE Solomon Islands

HQRE Singapore
- 54 (FARELF) Support Squadron
- 59 Field Squadron
- 84 Survey Squadron
- 556 Field Survey Depot.
- Singapore Engineer Squadron
- 70 Training Squadron, Gurkha Engineers (from June 1970)

Plans were by this date already well advanced for total evacuation to be effected in December 1971, but the decision of 1970 to retain the Commonwealth (ANZUK) contingent

rendered invalid many of the assumptions on which these plans had been based, and - notwithstanding a substantial continuous load of engineer commitments - the dates for withdrawal or alternatively disbandment were ordered to be brought forward. Presently Singapore District was reduced to the status of an Area; and to the CRE Singapore was in due course remitted the melancholy task of superintending the rundown and evacuation of the Engineers, which began in October 1970. After all the equipment and stores which were designated to be preserved for service elsewhere had been removed, the British Army's properties and effects were transferred - notionally by sale - to an organization called the Base Economic Conversion Department (BECD) set up by the Government of the Republic. From the Area Land Agent this organization accepted the lands, from the department of the Environment the buildings and fixtures, and from units the remaining equipment and stores.

This process, insofar as the Corps was concerned, started with the survey installations and 84 Survey Squadron and 556 Field Survey Depot being disbanded on 31 December 1970. On 1 July 1971 the RE Mess was turned over to the RAOC (who by then - together with the RCT and RAMC - made up the majority of members) and went, at its final closing, to the Singapore Army for use as an Officers' Club. In their turn the Engineer Park and Gillman Barracks, valued respectively at £4,100,000 and £3,600,000, changed hands for the nominal sums of one Singapore Dollar each.

The remaining units then dispersed or were disbanded. The last to disappear altogether - carrying with it into oblivion the terminal traces of Malayan Royal Engineers - was the Singapore Engineer Squadron, which was disbanded in August 1971; on 28 August HQ RE Singapore closed down. The troop destined to represent the Corps in the ANZUK Engineer Squadron was found from 59 Independent Commando Squadron, the main body of which remained in support of 3 Commando Brigade, Royal Marines, until with them it returned, in December 1971, to the United Kingdom, having completed seven years of duty as a field squadron in the Far East.

Malaya

The story of Malaya District through these years was a similar one of progressive retrenchment and of successive

reorganization leading to evacuation in 1970. Consequent upon the removal from the Corps of responsibility for Works Services and the transfer of many War Department properties to the Malayan Government at the time of Independence, the appointments of CRE (North) and CRE (South) lapsed as the tour of duty of each incumbent came to its end. The post of Chief Engineer also was abolished when the first Civilian Area Works Officer was established under the new organization on 1 June 1960. From that date, the Commandant of the Gurkha Engineers, who was also CRE 17 Gurkha Division, became the adviser on all engineer matters to the GOC Overseas & Commonwealth Land Forces (OCLF).

Meanwhile, the Engineer Training Centre (ETC) at Kluang - a GHQ establishment - was absorbed into the Gurkha Engineers on 13 November 1961. In the process, the Gurkha Training Squadron disappeared and 70 (Gurkha) Field Park Squadron was restyled 70 Gurkha Park Training Squadron. RHQ was then provided with an increment of RE Trades Instructors and of Malayan RE and continued to operate the ETC to the end on the same lines as before. Thereafter the Gurkha Engineers had a static HQ & Training Establishment and three field squadrons (69 was raised in 1961) available for duty in the field.

The Commandant (Lieutenant Colonel L G S Thomas) was now at once CO of his Regiment, Commandant of the ETC, and CRE 17 Division/OCLF. In the last of these roles he found himself responsible, in addition to his own squadrons, for 11 Independent Field Squadron and 410 Plant Troop in 28 Commonwealth Brigade Group and for the remaining RE Stores Sub-Depot at Taiping; and concerned with contingency planning for possible operations outside Malaya in fulfilment of SEATO obligations.

Early in 1962 began the progressive dismantling of 17 Gurkha Division as an operational formation and the breaking up of the divisional troops, including the Gurkha Field Engineer Regiment. This disintegration began in May 1962 with the departure of 68 Gurkha Field Squadron, on an independent establishment, to join the Strategic Reserve in UK whence it would in due course return to take part in the operations in Borneo; and in October, 67 Independent Gurkha Field Squadron left Kluang for Hong Kong in relief of 54 Corps Field Park Squadron, in support of 48 Brigade.

There were then in Malaya District only 28 Commonwealth Brigade (11 Independent Field Squadron) in the north and 99 Gurkha Infantry Brigade (69 Independent Gurkha Field Squadron) in the south. It was intended that the rump of the Division would next be merged with Singapore Base District in a static administrative and training command, in which the commander of the Engineer Base Group would act as adviser to the GOC. For the time being, however, the nucleus of a divisional headquarters was preserved, with the Commandant of the Gurkha Engineers continuing to play the part of CRE.

Such was the situation when, in December 1962, the outbreak of the Revolt in Brunei and the ensuing operations in Borneo arrested any further implementation of the plan and also delayed indefinitely a threatened reduction in Gurkha manpower. The residue of HQ OCLF/Malaya District in 1964 became an Area Headquarters and the Commandant Gurkha Engineers doubled in the role of CRE Malaya Area. In December 1965 HQ 17 Gurkha Division reverted to West Malaysia. After the Borneo operations ceased in August 1966 it was decided to retain the Establishment provided for HQRE Borneo under a new designation of CRE (Ops) FARELF, responsible for engineer projects in hand in Thailand and in Borneo as well as those in West Malaysia. He was directed to assume also the duties of CRE 17 Division/Malaya District, with effect from November 1966 including the limited formation training which was possible[1]. The Commandant Gurkha Engineers reclaimed the title of CRE 17 Division/Malaya District on 7 November 1968, at which point the Divisional Engineers were composed as follows:

11 Independent Field Squadron
(28 Commonwealth Brigade)
59 Field Squadron
(3 Commando Brigade)
67 Gurkha Field Squadron
(99 Gurkha Infantry Brigade)
54 FARELF Support Squadron
(Singapore Base District)

Towards the end of 1969 the plans for evacuation began to take effect. In November, 59 Squadron passed under command of the newly created HQRE Singapore, together with 54 Support Squadron. In February 1970, after fifteen years' service

in the Far East, 11 Squadron reverted to the Home Establishment, leaving behind its attached Australian troop to join the ANZUK engineer squadron; and, in the same month, 99 Gurkha Infantry Brigade was dissolved. On 28 February, HQ 17 Div/MalDist was disbanded and all British troops then remaining came under a new HQ Malaya Area, in which the Commandant Gurkha Engineers continued for a further brief spell to act as CRE, until on 17 July the post was finally abolished.

At Kluang the Training Establishment (ETC) was progressively reduced between November 1968 and May 1970. On 28 February, having been in existence for twenty years, the office of the Chief Instructor closed its doors; on 4 March 67 Squadron sailed away to Hong Kong, and in May 1970 the Park Training Squadron shed its Park element and removed to Singapore, where it carried on with trades training until disbanded as already noted. Meanwhile the HQ & Training Establishment was redesignated RHQ The Gurkha Engineers on 1 July 1970; in turn the buildings and training grounds were surrendered to the Malaysian Engineers and, on 17 July, the last draft left for Hong Kong. Kluang Garrison was finally abandoned by the British Army on 31 August 1970.

Hong Kong

In 1959 the Royal Engineer Establishment in Hong Kong comprised a Chief Engineer, a CRE (Works), 54 Independent Field Squadron in support of 48 Gurkha Infantry Brigade, a Bomb Disposal Troop of Chinese sappers attached to 306 ESD, a Movement Control section and an Army Postal Unit. The CRE (Works) was displaced before the end of the year by a civilian Works Officer of MPBW and, in February 1960, the post of Chief Engineer was disestablished and a CRE substituted as the principal engineer officer in the Colony. In October 1962, 54 Squadron was relieved by 67 Gurkha Squadron, and in the same year 306 ESD and the BD troop were amalgamated to form what was known intitially as the Hong Kong Fortress Squadron and subsequently the Hong Kong Support Squadron. In 1968 it was renamed the Hong Kong Engineer Park.

On the premise that when the Brigade of Gurkhas came to be based in Hong Kong the Commandant of the Gurkha Engineers would double as CRE, a separate Establishment for CRE was surrendered with effect from October 1967. There followed a

year during which an SO2RE in HQ Land Forces acted as the representative of the Chief Engineer FARELF. By then it had become evident that the programme for withdrawal from Malaysia would not release the Gurkha Commandant before 1970; accordingly, the existing cover for CRE (Ops)FARELF was appropriated temporarily to fill the gap and the incumbent assumed the duties of CRE Hong Kong in November 1968.

With an eye to the future, the Engineer Park was at the same time reinforced from 63 CRE (Construction) in Singapore by two officers, a clerk-of-works and a surveyor, and entered upon a phase of growth and reorganization from which it emerged as the Hong Kong Support Squadron, later 54 (Hong Kong) Support Squadron. In April 1970, HQ Land Forces, Hong Kong was made independent of FARELF, by which date the Gurkha Engineers, on their reduced Establishment, were concentrated in the Colony. In December of that year the Survey Branch from GHQ joined HQLF, so that, by August 1971, when the evacuation of Singapore was completed, the Engineer order of battle took the following form:

CRE Hong Kong/Commandant Gurkha Engineers
AD Survey
RHQ The Gurkha Engineers
67 Gurkha Field Squadron (51 Infantry Brigade)
68 Gurkha Field Squadron (48 Infantry Brigade)
54 (Hong Kong) Support Squadron
40 PCCU

There were also at this time a number of Royal Engineers seconded in a civilian capacity to the Public Works Department.

With the closing-down of GHQ FARELF, HQRE in Hong Kong took over all the remaining engineer commitments of the British Army in the Far East and beyond, including those in Nepal and Brunei, the Jungle Warfare School at Kota Tinggi in West Malaysia, and the specialist teams at that time working in Thailand and the Solomon Islands. The CRE also found himself responsible for the employment and supervision of squadrons detached from time to time from the United Kingdom on short-term project tours in the theatre, as well as for the engineer aspects of exercises mounted as far afield as Fiji and in Australia. The post had thus become one of the most exacting and

rewarding regimental lieutenant-colonel's appointments in the Corps.

In April 1973 the Field Squadrons of the Gurkha Engineers (GE) were re-roled, with 67 Gurkha Field Squadron in support of 48 Brigade and 68 Gurkha Field Squadron in support of 51 Brigade.

On 15 December 1975, 54 (Hong Kong) Support Squadron returned to UK to take over from A Squadron Junior Leaders Regiment, Dover. At the same time HQ Squadron was formed (subsequently renamed Support Squadron in 1978) at Sham Shui Po whilst 67 and 68 Squadrons exchanged camps with 67 Squadron, now at Perowne Barracks, and 68 Squadron, at Bowring Camp. Two years later the Gurkha Engineers were honoured with their Royal Title of Queen's Gurkha Engineers (QGE), 29 years after their formation. Therefore by 1980 the only permanently established Royal Engineer units in Hong Kong were the Queen's Gurkha Engineers and a Postal and Courier Communications Unit.

MALAYA

Commonwealth Brigade Cantonment, Terendak

In the now independent Federation of Malaya, the Kedah Roads (*see* Vol X Chapter 7) were finished in May 1959, and officially opened by HH The Sultan in September. The following year the long drawn-out State of Emergency was at last declared at an end, and calls on the engineers of Overseas & Commonwealth Land Forces (OCLF) for operational support suddenly ceased. Training and exercises now became the principal occupation of the British troops located in the Federation; nevertheless, numerous tasks continued to present themselves for the Sappers right up to the end of our evacuation from the area. An early commitment was the construction of a Brigade Cantonment near Malacca.

Under the terms of a Defence Agreement entered into at the time of Malayan independence, it was agreed that a Commonwealth force should remain stationed there indefinitely for which this new cantonment would be created at Terendak. It proved to be not only the last major construction project carried through by the Corps before the responsibility for Works Services was finally surrendered, but also the largest single

undertaking in that field since the end of World War Two. After a modest start by Malaya District in 1957 (*see* Vol X Chapter 7), a special CRE (Works) was appointed in 1958, initially under the Chief Engineer FARELF. It was at the same time decided that the DCRE, one GE and two Clerks-of-Works (Construction) would be found by the Royal Australian Engineers, and one GE by the Royal New Zealand Engineers. From October 1959, control was transferred to the Works Group (FE) established in Singapore by the new civilian Army Works Organization, but it was agreed that Terendak should be one of the so-called "Special Projects" reserved to be completed under RE supervision. The cost, amounting to approximately £M7¾, was to be shared by the Governments of the United Kingdom, Australia and New Zealand roughly in proportion to the strengths of their respective components of the force, established as a brigade group of All Arms and composed as follows:

Brigade Headquarters & HQ Company
Three infantry battalions (UK, Australian & NZ)
A field artillery regiment (including an Australian battery)
An independent field squadron of engineers (including an Australian troop)
A signal squadron
A mechanical transport company
A field ambulance
An ordnance field park
An infantry workshop
A light aid detachment
A provost company

These units, with their families and attached civilians, presented a requirement in accommodation for a total population of 10,000, with all associated services, commercial facilities and amenities.

To maintain the brigade, provision was made for a landing-craft hard, an airstrip, a post-office, signals centre and supply depot; a fire-station, a 150 bed hospital, three churches and a cemetery would take care of the natural hazards of life in the cantonment. For the families, 1,026 married quarters were needed, as well as a primary school, a secondary school and a hostel to house single teachers. The NAAFI called for an arcade

of shops and an English style public house, together with a supermarket and bulk storage incorporating deep freeze refrigeration, a butchery and a bakery. Among the amenities specified were an education centre, a gymnasium, an Olympic size swimming pool, 31 playing fields, 35 tennis courts, basketball pitches, an air conditioned cinema and a variety of banks and shops; while three beach clubs, a sailing club and a 9-hole golf course were provided, largely out of private or Nuffield Trust funds. Rifle ranges and overall landscaping completed the schedule of items to be disposed in an area of 4,750 acres of forest and rubber plantation, of which some 1,500 would be occupied by buildings.

Planning was initiated in the Chief Engineer's Branch at GHQ, but consultant architects and civil engineers were retained for surveys, external services and for the design of the bulk of the married quarters, as well as for the hospital, the churches and other community buildings and facilities. Barrack accommodation consisted of single-storey blocks built on the "Permalcon" (Permanent Malayan Construction) system evolved in Malaya Command in 1954 (*see* Vol X Chapter 7) with concrete piers carrying timber trussed tile-clad roofs. For two storey dwellings site-made concrete bricks were employed; elsewhere some fair faced clay brickwork found a place; for large span buildings, Messrs Taylor Woodrow's "Arcon" system of prefabricated construction was used. In all, ten principal building contractors were engaged and seven specialist ones, in addition to a number of smaller local agencies and a directly-employed labour force (DEL) totalling, at the peak, 650; some 120 pieces of plant were also operated by locally recruited civilians within the CRE Establishment.

By July 1960, when Lieut Colonel H W Baldwin took over as CRE, the initial planning and preliminary earthworks had been completed and four of the main contracts had been let. The staff assembled to direct and supervise the works consisted of 20 officers (or civilians of officer status) distributed in the following appointments:

1 lieutenant colonel (CRE)
4 majors (DCRE, ACRE, quantity surveyors 2)
8 captains/executive engineers

Construction	4
Plant and DEL	1

E & M 1
Quantity Surveyors 2
1 lieutenant (i/c survey and setting out)
1 quartermaster
1 transport officer
2 administrative officers (Finance & Civilians)
2 national service officers (Forestry & Landscaping)

Subordinate military and civilian personnel, comprising clerks-of-works, surveyors' assistants, drawing office staff, clerks, storemen, plant operators, drivers and maintenance men, and a detachment employed on security and general duties, amounted to 290, made up as follows:

Royal Engineers	14
Royal Australian Engineers	2
Malayan Other Ranks	31
Civilians:	
UK based	6
Locally recruited	237
	290

On the eve of its disappearance from the order of battle, 410 Plant Troop RE made a final appearance on the stage at Terendak to carry out extensive earthmoving on the 600-yard rifle range and on the air strip.

After six years the works were almost finished when, towards the end of 1962, an unfortunate accident removed Lieutenant-Colonel Baldwin from the scene, leaving his DCRE (Major K Knowles RAE) to round-off the outstanding amenity items and bring the project to completion. As HM Government was committed to a deadline for evacuating camps in North Malaya, it was a matter of no little satisfaction that all the units of 28 (Commonwealth) Brigade, including 11 Independent Field Squadron, were able to remove themselves on time into their new township on the coast of Malacca.

Bukit Mendi Project

In the search for engineer training projects, discussions were

Lieut Gen Sir David Willison KCB OBE MC Chief Royal Engineer
Nov 1977- Dec 1982

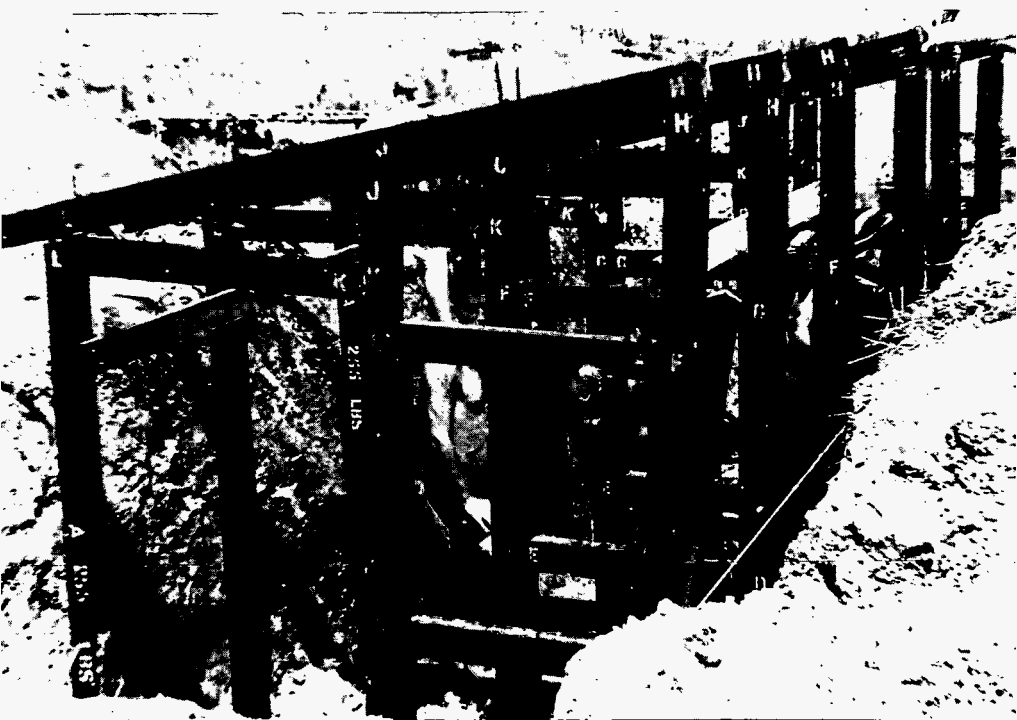
A Class 60 M2 Ferry built by 23 Amphibious Engineer Squadron crossing the River Weser on Exercise Keystone in 1979

An M2 bridge built by 28 Amphibious Engineer Regiment at Xanten on the night of 17/18 July 1978

A Class 60 M2 Ferry & M2 Bridge

Typical company base in Borneo during Confrontation

A Bowen Bunker frame being assembled



Camp structures being built by 67 Gurkha Field Squadron

A helipad in Borneo being cleared by 9 Parachute Squadron 1965.
(Courtesy Imperial War Museum)

67 Gurkha Field Squadron & 9 Parachute Squadron 1965.

FAR EAST THEATRE 1967
MAP 5
JAPAN
Shanghai
Yellow Sea
NEW DELHI
NEPAL
Lhasa
KATHMANDU
Dharan
BHUTAN
CHINA
EAST PAKISTAN
DHAKA
Calcutta
INDIA
Mandalay
BURMA
HANOI
NORTH VIETNAM
LAOS
VIENTIANE
Canton
MACAO
HONG KONG
TAI-PEI
TAIWAN
PACIFIC OCEAN
South China Sea
RANGOON
THAILAND
Savannakhet
Ubon Ratchathani
BANGKOK
CAMBODIA
SOUTH VIETNAM
PHNOM PENH
SAIGON
MANILA
PHILIPPINES
Bay of Bengal
Madras
CEYLON
COLOMBO
Kota Belud
SABAH
Kuala Trengganu
MALAYA
BRUNEI
Jesselton
KUALA LUMPUR
Malacca
Terang
Kluang
Kulai
Kota Tinggi
Singapore
SARAWAK
KALIMANTAN (BORNEO)
INDIAN OCEAN
N
MILES
0 200 400 600 800
0 400 800 1200
KILOMETRES
JAKARTA
INDONESIA
PAPUA NEW GUINEA
AUSTRALIA
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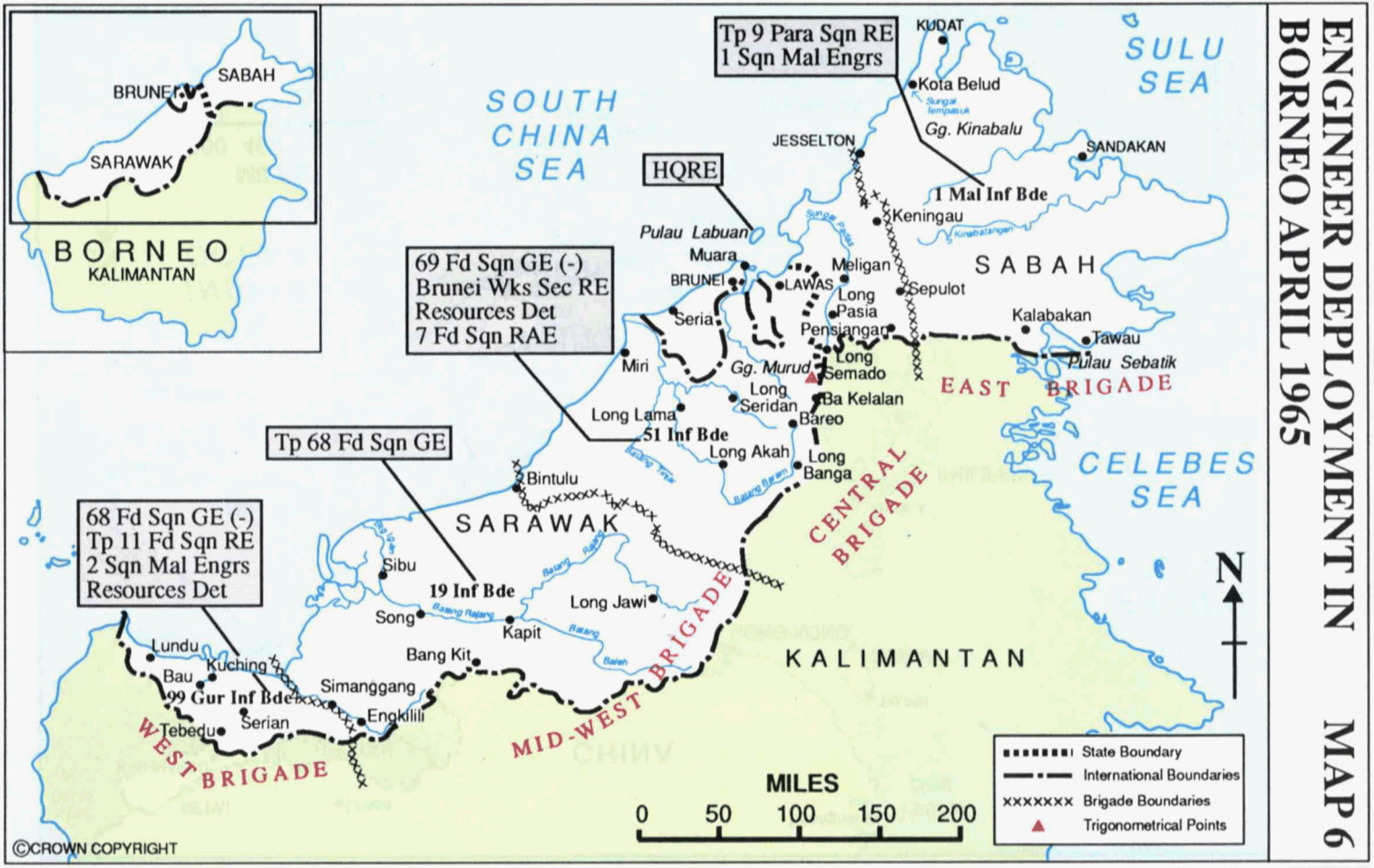
ENGINEER DEPLOYMENT IN BORNEO APRIL 1965
MAP 6
BRUNEI
SABAH
SARAWAK
BORNEO
KALIMANTAN
SOUTH CHINA SEA
SULU SEA
CELEBES SEA
KALIMANTAN
SARAWAK
SABAH
Tp 9 Para Sqn RE
1 Sqn Mal Engrs
HQRE
69 Fd Sqn GE (-)
Brunei Wks Sec RE
Resources Det
7 Fd Sqn RAE
Tp 68 Fd Sqn GE
68 Fd Sqn GE (-)
Tp 11 Fd Sqn RE
2 Sqn Mal Engrs
Resources Det
KUDAT
Kota Belud
Gg. Kinabalu
JESSELTON
SANDAKAN
1 Mal Inf Bde
Keningau
Pulau Labuan
Muara
BRUNEI
LAWAS
Meligan
Long Pasia
Sepulot
Seria
Pensiangan
Kalabakan
Tawau
Pulau Sebatik
Miri
Gg. Murud
Long Semado
Long Seridan
Ba Kelalan
Bareo
Long Lama
51 Inf Bde
Long Akah
Long Banga
Bintulu
Sibu
19 Inf Bde
Song
Kapit
Long Jawi
Bang Kit
Lundu
Kuching
Bau
99 Gur Inf Bde
Serian
Tebedu
Simanggang
Engkilili
EAST BRIGADE
CENTRAL BRIGADE
MID-WEST BRIGADE
WEST BRIGADE
N
MILES
0 50 100 150 200
State Boundary
International Boundaries
Brigade Boundaries
Trigonometrical Points
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started in 1967 with the Federal Land Development Authority (FLDA) of the Malaysian Government in the context of Military Aid to the Civilian Community (MACC). At length agreement was reached for the construction, on a cost-sharing basis, of a secondary access road and housing for settlers in connection with a large oil-palm complex being formed out of four adjacent estates totalling 30,000 acres of plantation, at Bukit Mendi, near Triang in Pahang. To these requirements was added by way of a gift from the British Government a community centre, for which an allocation of funds was made to cover the cost of materials.

The Bukit Mendi Project is remarkable, particularly for the Memorandum of Agreement - the nearest, perhaps, the Corps had come to a Contract - under which it was undertaken. This document defined precisely the responsibilities both of the Army and of the FLDA; but, because the primary aim of the former was to obtain good engineer trades training, an indication only was given of the amount of work to be done and no firm commitment as to completion was entered into. On that basis an augmented field troop, about 70 men, together with the necessary plant and equipment, were to be furnished at the Army's expense for a period of approximately one year; the FLDA were to provide all materials and to refund an agreed proportion of the "extra costs" involved in deploying and maintaining the soldiers away from their bases. The duration of the project was to be from 1 December 1968 to 31 January 1970.

Design and control were remitted to 63 CRE (Construction) and the work was executed by troops found in turn by 11 and 59 Field Squadrons and 67 Gurkha Field Squadron, with detachments from 54 (FARELF) Support Squadron. Joinery was assigned to trainees of 70 Park Training Squadron, Gurkha Engineers, to be carried out in part on site and in part pre-fabricated at Kluang, and ironwork and "specials" to Engineer Workshop & Park in Singapore. Preliminaries on the site camp were begun on 15 November 1968, costed work on 1 December and on 29 January 1970, the end of the operation was signalled by a ceremony performed by the Mentri Besar of Pahang; on 5 February, the last of the soldiers departed, having completed four miles of road, two pre-stressed reinforced concrete bridges, 46 timber houses and the community centre. Excluding temporary deployments on ancillary and exercise tasks, the sequence of reliefs had been as follows:

54 (FARELF) Support Squadron	15 Nov 68 to 31 Dec 68 23 Jun 69 to 5 Feb 70
11 Independent Field Squadron	1 Jan 69 to 27 Feb 69 27 Sep 69 to 20 Dec 69
59 Field Squadron	28 Feb 69 to 30 Jun 70
67 Gurkha Field Squadron	1 Jul 69 to 20 Sep 69

All the works undertaken were completed in the time allowed and also within the sum forecast, at a saving to the Malaysian Government of some £50,000.

Floods in Johore

December 1969 was notable for phenomenally heavy rains in the southern part of the Malay Peninsula, which, coinciding with exceptionally high tides, caused flooding in Central Johore to an extent unknown in living memory. In the course of rescue operations at Kluang, engineer assault boats brought hundreds of people to safety while, in the aftermath, Sappers were employed for many days recovering corpses, repairing roads, building footbridges and evacuating flood damaged areas.

Kulai Road Project

In the closing months of 1970, 59 Field Squadron was called upon once again to assist the FLDA in the construction of three miles of road, including fourteen culverts, near Kulai in south Johore, the purpose of which was to link two adjacent oil-palm estates so that the produce of one could be processed at the other, thus avoiding the necessity to set up a second factory. The specification was for a 14-foot wide carriageway of 8 inches thick crushed rock pavement with 5-foot wide shoulders; the ruling gradient was to be 1 in 20 and the maximum 1 in 10. This project turned out to be not a very happy one. Access proved difficult, the working area was restricted and the alignment confined to an existing road reserve, while heavy rains arrived earlier than forecast to hinder progress. That which started as a part time assignment for a single troop for three months developed into a full time occupation for the greater part of the squadron, most of which had then to be withdrawn at short notice for relief operations in East Pakistan (*see* below). The works were, nevertheless, formally handed over, albeit unfinished, on 19 December 1970.

Exercise Bersatu Padu

Despite the reduction in the British Army's permanent presence in the Far East, a residual commitment still existed to reinforce, if necessary at short notice, the slender outposts remaining. This capability was demonstrated in 1970 by the deployment of 19 Infantry Brigade Group (Brigadier G L C Cooper) from the UK Strategic Reserve in what was described by The Times as "the largest long-range airlift of men and equipment ever carried out by British forces". In this expedition the Royal Engineers were represented by 34 Field Squadron. The exercise in which they were destined to take part was named Bersatu Padu - in the Malay tongue "Complete Unity" - and was invested with considerable political significance, since the forces engaged were drawn from five Nations: the United Kingdom, Australia, New Zealand, Malaysia and Singapore.

The airlift out of England into Singapore (Changi) - deemed to be a "firm friendly base" - began on 12 April and was completed without incident by 21 April. The brigade group brought with it all personal and unit weapons and equipment, including helicopters and light vehicles, but the heavy items were consigned by sea in time to marry up on arrival. There ensued an interval for intensive jungle training in Johore before "real time" operations were resumed on 13 June. These took the form of an amphibious assault followed up by a fly-in of two brigades, a synchronised helicopter descent by a third, and a subsequent advance into the interior to deal with a hostile "People's Liberation Army" represented on the ground by Royal Marines and a battalion of Gurkha Rifles. The Sappers participating were 34 Field Squadron (19 Brigade), the ANZUK Engineer Squadron (28 Commonwealth Brigade), and Malaysian Engineers in support of their own troops; 59 Field Squadron, from Singapore, enjoyed the unique experience of playing for both sides as well as for neutral control. The exercise concluded on 30 June and by 10 August the last of the UK contingent were back in England.

The venue chosen for the manoeuvres lay in the State of Trengganu in the north eastern corner of West Malaysia and some 250 - 300 miles distant from base; it offered a variety of hilly primary rain forest, riverain cultivation and swamp, served sparsely by metalled roads with a ramification of inland tracks. The engineer activities involved were wholly conventional; 34

Field Squadron, for example, was employed on airstrip maintenance, clearing of booby traps, water supply, helipad construction and the building of an air conditioned dugout command post to accommodate brigade headquarters. Forward Exercise Control Headquarters (FXHQ) included a simulated Divisional HQ, within which the GSO2 (Ops) doubled in the role of CRE, disposing procurement teams for materials both for live and for simulated situations and operating a damage control organization throughout the Exercise area.

Though the operational tasks were not particularly exacting, the preliminaries and logistic support for Bersatu Padu imposed a heavy load on the RE resources in Singapore. Planning started as early as 1 June 1969, and in August work was begun by the Singapore Engineer Squadron RE under the direction of 63 CRE (Construction), to improve two existing grass strips, of which one (Penarek - built in 1967 by 51 Field Squadron (Airfields) was to be "operational" - in the sense that it was to be used by the troops being exercised - and the other, at Dungun, forty miles South of Kuala Trengganu, for FXHQ. Both would be surfaced with laterite, while that at Dungun was to be extended from 1,200 feet to 3,000, with a 400-ft overrun, and furnished with taxiways and a parking apron, helicopter hard-standings and an access road from the administration area being developed nearby. Major earthwork here was completed before the monsoon broke and surfacing, marking and fencing were proceeded with after, so that the finished airfield could be proved and handed over for maintenance to the Malaysian Engineers on 28 May 1970.

The preparation of the camp at Dungun, planned to accommodate FXHQ and to house 1,200 persons including, beside the Control Staff, a multitudinous international Press Corps and an intimidating body of VIP observers, was assigned to 54 (FARELF) Support Squadron supplemented by local contract. Among the Sapper tasks was the provision of 36,000 gallons of treated water per day, showers, electric lighting and power, cold storage and air conditioning installations, roads and bridging, and hard standing for tents and vehicles. Hutting and other semi-permanent structures to Ministry of Defence specification were put out to contract. In support, FARELF Engineer Park in Singapore was committed in letting contracts, in effecting local purchase, and in issuing stores on a substantial

scale; while 84 Survey Squadron and 556 Field Survey Depot, in collaboration with the Malaysian Directorate of National Mapping, produced in large numbers the necessary maps and traces.

BRUNEI AND BORNEO

Kota Belud Training Area

In order to provide the Commonwealth armed forces in the Far East with a more suitable training area than could be provided by the densely forested terrain of the Malay Peninsula, an extensive land acquisition had been made in 1959 near Kota Belud in the uplands of North Borneo. Work was set in hand in May of that year by 67 Gurkha Field Squadron with supporting detachments to adapt it to receive at any one time up to a brigade group of All Arms. Owing to the inaccessibility of the area selected, all heavy plant, equipment and stores had, at first, to be brought in by raft up eight miles of the River Abai. The principal tasks were the improvement to Class 20 standard of 23 miles of hill-section road between Jesselton and Kota Belud and the construction of crossings of the Rivers Tempasuk and Gunding. The former was first negotiated by a causeway, opened on 9 April 1960, and named after the Countess Mountbatten which was subsequently replaced by a bridge. Other work included the construction of an airstrip to accept Beverley transport aircraft, waterworks, camp structures and the necessary roads and bridges to facilitate deployment of troops within the training area and to connect with beaches in the north-east.

The works in British North Borneo were directed by the CRE 17 Gurkha Division until January 1961, when they were taken over by the office of the Chief Engineer FARELF. The undermentioned units were engaged in rotation for some six months at a time, certain of them doing more than one tour:

11 Independent Field Squadron
74 Field Park Squadron (Plant Troop)
75 (Malayan) Field Squadron
Singapore Engineer Regiment (Plant Troop)
67 Field Squadron, Gurkha Engineers

68 Field Squadron, Gurkha Engineers
69 Field Squadron, Gurkha Engineers
1 Field Squadron, Federation Engineers
2 Field Squadron, Federation Engineers

The first infantry battalion (2/7 Gurkha Rifles) marched in in January 1960 and was employed on the construction of "basha" hutments using materials supplied by the RE; by May of that year the Training Area was a going concern, though it was not until 1963 that the works were completed and the processes of reconditioning the plant and equipment and backloading it to Singapore could be taken in hand.

The last major task in connection with the training area in North Borneo was to bridge the Tempasuk River at the site of the Countess Mountbatten Causeway built by 67 and 68 Gurkha Field Squadrons in 1959/60. This was undertaken in collaboration with the PWD by 11 Independent Field Squadron, who launched four 130 foot double-double Bailey spans over three high level piers to form a Class 40 bridge 524 feet in length between concrete abutments served by extensive ramped approach roads. From a technical point of view this operation presented no particular problems; but a strict time limit and the liability of the river to sudden and unpredictable spate combined to lend interest - and no little hazard - to the work.

Revolt in Brunei

In the early hours of 8 December 1962, attacks were made with little warning on police stations and public buildings throughout the Sultanate. In Brunei Town, the power station and the airfield were occupied by the rebels, power and water supplies were interrupted, and runways blocked. Employees of the PWD were everywhere intimidated and dispersed, while in the principal towns Europeans were seized and held hostage. Arrangements for the despatch of troops were made immediately by GHQ in Singapore and the situation was quickly brought under control.

The first Sappers to appear were a detachment of 69 Gurkha Field Squadron, flown down from Kota Belud. Reinforcements continued to arrive by sea and air and, on 19 December, the GOC 17 Gurkha Division was appointed to command all Commonwealth and British Forces in Borneo with the title of COMBRITBOR and a hastily improvised staff. The GOC sent at once for his CRE, but the carefully preserved HQRE of the

Commandant Gurkha Engineers was not mobilized and, after submitting an Appreciation of the Engineer Situation, Lieut Colonel L G S Thomas returned to Kluang. Major D J N Genet, OC 54 Corps Field Park Squadron, who had already been nominated OCRE Borneo, thus became the GOC's engineer adviser. By January 1963, the whole of 69 Squadron was deployed in Brunei with an extemporized field park troop found by 54 Squadron under command. Other engineer elements early on the scene were a detachment of 10 Port Squadron in the docks, a Movement Control Section, and the specially created Brunei Works Section operating principally in place of the disrupted PWD.

For the relief of Limbang and Bangar two sections of 69 Squadron were assigned in support of 42 Commando, Royal Marines, and constructed a raft of oil drums to ferry the column and its vehicles across the Pendaruan River. The passage was fortunately unopposed, but the incident is of interest as the first in which Gurkha Engineers acted in direct support of other arms in face of an enemy.

December and January were marked by exceptionally heavy rains followed by disastrous flooding throughout Sarawak, Brunei and British North Borneo; notwithstanding which numerous tasks - including the operation of native long boats - were undertaken by the engineers in assisting to quell the Revolt. The most significant operation in that period was the development of an existing landing ground in hilly jungle terrain at Long Seridan, 60 miles distant from Brunei, to take twin engined Pioneer aircraft with an emergency capability for medium range Beverley transports for the rapid deployment of troops in the interior. This task, carried out by a troop of 69 Squadron between January and April 1963, is remarkable as the first in which extensive use was made of air transported plant and equipment. The experience gained here contributed much to the evolution of a family of machines specially developed for the purpose.

The last of the insurgents in Brunei were captured on 8 May 1963, thus bringing to an end what came to be known as Azahari's Rebellion. But meanwhile much more serious trouble was brewing elsewhere in Borneo.

Indonesian Confrontation

The so called "Undeclared War" with Indonesia opened with a

rebel raid on the police station at Tebedu in Sarawak on 12 April 1963. This was followed by a series of sporadic attacks across the mountainous jungle clad border by ill trained and poorly armed gangs at first identified as "bandits". To begin with these incidents were confined to the western tracts of Sarawak, but when that colony and British North Borneo (Sabah) became merged in the new province of East Malaysia, Indonesian reaction increased in intensity and attacks became more frequent and widespread; in August 1963 a state of "Confrontation" was formally declared.

As the year advanced, activity spread across the entire thousand or so miles of frontier and Indonesian regular forces began to appear among the raiders. At the same time the Communist insurgents resumed their activities, posing a threat to internal security. The equivalent of a single brigade group, with one field squadron in support, which had sufficed to smother the early outbreaks of rebellion in Brunei and Sarawak were seen to be insufficient to deal with the new situation and massive reinforcement became necessary. Eventually, four brigade areas were established covering the zone of operations on land (*see* map 6), in which the GOC disposed fourteen battalions of infantry, the equivalent of two more of police field force and some locally raised Border Scouts, supported by armoured cars, artillery and, at the peak, five field squadrons and several specialist detachments of engineers.

In December 1963 the OCRE appointed during the Brunei Revolt was relieved by a specially established CRE Borneo, with an adequate staff, attached to force headquarters which had been set up on the island of Labuan. With the increase in general force levels the demand for engineer support increased and, therefore, the involvement of engineer units rose. The build up of engineer effort (*see* Figure 7) reached a climax at the end of 1964, but a system of relief by whole units in rotation meant that more than twice the number of field squadrons mentioned above actually took part; alone the Port and Survey squadrons were represented continuously in the field. The following units of British, Gurkha, Australian and Malaysian engineers were, in whole or in part and for various periods, engaged in the campaign in Borneo:

9 Independent Parachute Squadron
10 Port Squadron

11 Independent Field Squadron (including RAE troop)
32 Field Squadron
54 Corps Field Park Squadron
67 Independent Field Squadron, Gurkha Engineers
68 Independent Field Squadron, Gurkha Engineers
69 Independent Field Squadron, Gurkha Engineers
84 Survey Squadron (plus troop from 42 Survey Engineer Regiment)
1 Field Squadron RAE
2 Field Squadron RAE
21 Construction Squadron RAE
22 Construction Squadron RAE
1 Squadron, Malaysian Engineers
2 Squadron, Malaysian Engineers
3 Squadron, Malaysian Engineers

In addition to those listed above, two stores detachments (Brunei and Kuching) were mobilized from EBI Singapore, as well as the Brunei Works Section, later to become 522 STRE (Construction). Postal & Courier Communications furnished a detachment to accompany the first battalion group to be deployed and BFPOs were subsequently installed, under a DADPCC Land Forces Borneo, to serve the principal operational areas. Due to delay in reinforcement from UK, however, the postal service was at first obliged to rely to a large extent on the Civil Administration, in consequence of which classified material had for a time to be handled by Royal Signals. Until replaced by RCT in 1965, 10 Port Squadron operated Ramp Powered Lighters (RPL) in support of operations and enjoyed on the eve of dissolution the privilege of experimenting with hovercraft in their debut as engines of war.

In the course of Confrontation, which extended over three long years, the contribution made by the engineers is rarely identifiable with specific incidents or engagements. In a tropical theatre possessing an insignificant mileage of motorable roads, effectively no railways, and one deep sea port, where every battalion camp, company base and platoon post had to be built from scratch, and in which the air was to provide the Army's flexibility, the Sappers were never likely to be short of work. Decisions on larger projects were made centrally at Force Headquarters in Labuan, as was the allocation of resources and of specialists. Brigades, however, were accorded a fair degree of

autonomy in their own areas and this, together with the difficulties of communication, made it necessary for them to have some Sappers at their own disposal. The arrangement made was for the squadrons to be under command of the CRE, but to detach one troop to each brigade in direct support. By way of example, the situation as it appeared on 1 April, 1965, is shown on map 6. In practice, many of the centralized tasks were effectively in direct support of operations, so that the distinction between brigade and CRE's projects was a fine one. A major difficulty at the start of the campaign was the almost total lack of useful maps of the area. Though the field work in Sabah (formerly British North Borneo) had been completed in 1962, there were in existence at the start of Confrontation no standard specification military maps of the operational area and aeronautical charts at 1:1 million scale showed only coastal detail, the principal rivers and generalized relief. In Sarawak, the only post war military map available was a 1:10,000 town plan of Kuching. By 1963, thirty seven fully contoured 1:50,000 scale sheets had been produced, covering the West coast of Sabah and the State of Brunei. Over three hundred remained to be surveyed, drawn and published, representing at the current rate of progress at least eight years of further effort. The Survey Plan was accordingly recast in three phases:

Phase 1. Collation of all existing mapping and source material to produce a Series at 1:150,000 scale. In many areas these sheets would be virtually blank.

Phase 2. Compilation from all available survey data and air photographs of a Series at 1:250,000 scale.

Phase 3. Production of standard fully contoured 1:50,000 and 1:250,000 scale mapping related to operational priorities, based on survey data to be acquired.

The complete absence of survey data in the remote areas necessitated observation of a series of position and height fixes in order to determine location, scale and orientation of air survey photography to be used for map compilation. To give effect to this plan, a troop from 42 Survey Engineer Regiment was, in 1963, brought from UK to work alongside the troop of 84 Survey Squadron then in Sarawak; later, a second troop from 84

Squadron would be deployed in Sabah. Iban and Murut tribesmen were recruited locally for the construction of helicopter landing zones, for clearing sight lines and generally to provide labour for the survey parties, while native long boats were taken up for transport on the rivers. One impediment to progress was the ruling that survey requirements in respect of helicopter sorties should take precedence below those of operations, casualty evacuation and movement of VIP; another was the weather, which made it difficult to obtain new and constant height photography, so that a wide variety of material had to be used, some of it over fifteen years old and at differing and inappropriate scales.

The magnitude of the survey task called for assistance from numerous outside agencies in the United Kingdom, Kuala Lumpur, Sarawak, Sabah and Brunei. Financial support was contributed by the Government of Malaysia and, in the event, most of the printing was done in the theatre; by the conclusion of operations approximately half a million sheets had been issued through 556 Field Survey Depot in Singapore and by detachments established by it at each brigade headquarters in the field.

An outstanding feature of the campaign was the exploitation of air movement to position, succour and reinforce the infantry in their widely dispersed and otherwise inaccessible defended localities. In this, regular use was made of helicopters to provide the Army with tactical mobility; each jungle base required in its vicinity several landing zones (LZ) and a chain of these grew along the 1,000 mile border with Indonesia. A drill was quickly evolved by which a small party of sappers walking in, or roped down, could make a usable LZ in a matter of hours. To take the strain off the limited number of helicopters, jungle airstrips were built, and existing ones improved, to take light fixed wing aircraft. In all, fourteen such airstrips were constructed, and scores of helicopter LZs, some of the former turning out to be lengthy undertakings occupying a troop for as long as nine months.

In the early days it was common for heavy plant to be parachuted, or flown in, in pieces to be assembled on site, but as time went on lighter, air portable, machinery became available, of which a complete range was developed by the Malaysian Engineers. In some places it proved possible to introduce equipment and stores by river, or by a combination of air and water transport. Of this a notable example was the

reconstruction of an existing airstrip at Long Akah on the Baram River 200 miles distant from Brunei, for which 200 tons of Pierced Steel Planking (PSP) was transported by land and water. It was not, however, here practicable to move the heavy plant by the same means because of the limiting size of craft available for the last leg of the journey. Two D4 bulldozers and a Wobbly Wheel roller were accordingly dropped by parachute, while other machines were carried in underslung from Naval helicopters. Simultaneously the move of PSP, fuel and other stores from Brunei began. The first stage of 85 miles was accomplished by MT, over a route which degenerated from metalled highway to sand track, as far as the mouth of the Baram. There everything was transferred to RPL, operated by 10 Port Squadron, and conveyed to Long Lama, 90 miles up river. At Long Lama the stores were transhipped into local long boats manned by tribesmen and thus conveyed for the last 120 miles to their destination. On account of its shape, PSP was an ideal cargo for these long narrow craft, some of which carried loads of up to 10 tons. Subsequently, the Wobbly Wheel roller was broken down on site by squadron fitters and could thereafter be moved in sections under a Scout helicopter.

On the waterways hovercraft made their first appearance and the infantry increasingly took over the working of their own long boats, but the engineers continued as occasion required to make use of theirs and there was from time to time a demand for rafts. Road construction did not figure largely in the programme and conventional bridging hardly at all, though where jungle bases found themselves separated by rivers from their supply dropping zones, aerial ropeways and suspension bridges were sometimes called for. The most important road project, 60 miles in length and linking Keningau with Sepulot in Sabah, was undertaken by Royal Australian Engineers. It is significant that, whereas roads played a relatively small part in operations, those that were needed absorbed a disproportionate one third of the available sapper effort, calculated at one squadron per mile per month.

Defence and camp structures, and water supply services were in constant demand, creating a substantial prefabrication commitment at base, for which there was at first inadequate provision. When this deficiency was in due course made good, by a park troop of Malaysian Engineers and a detachment of 54 Corps Field Park Squadron, one of their biggest tasks was to

produce packs of timber framing for the 'Bowen Bunker'[2], designed to serve both as living accommodation and as a defensible blockhouse and suited particularly to sites where digging down was impracticable.

Another product manufactured in considerable quantities was the 'Murcott Filter'[3], consisting basically of a 4 foot long casing of 4 inch pipe containing a 'candle' made up from parachute cloth wrapped round fine wire gauze on an angle iron frame, which was evolved to meet the potable water requirements of platoon posts. For larger operational bases, 'Farelf Filters', treating 1,000 gallons per hour in association with suitable pumps, were supplied from Engineer Base Workshops in Singapore. Extemporized hot water showers were installed wherever possible and helped significantly to reduce the incidence of skin disease; and the 'Borneo Latrine' - a stack of three 40 gallon drums set in a mound of earth - found its place where the water table precluded the use of conventional deep trenches and sumps. The consumption of water exceeded all normal estimates, averaging 40-50 gallons per head per day, and it was usual for storage to be provided in each base for at least one day's supply - where practicable two.

All materials, and much else besides, had to be delivered by air and the installation and maintenance of all these services involved the deployment of small detachments of sappers in distant and scattered locations, making supervision virtually impossible. If, for the infantry, it was a 'company commander's war', for the engineers it was more often than not a corporal's. At the larger end of the scale, battalion camps in semi-permanent construction were built in 1965/66 at Sepulot in Sabah, and Bareo in Sarawak, by Gurkha Engineers assisted by 522 Specialist Team RE (formerly the Brunei Works Section), involving field squadrons in modest excursions into the fields of forestry and quarrying.

In the latter part of 1965 the enemy took to booby trapping helipads and sappers had to be sent to 'de-louse' them, while others accompanied infantry patrols to locate and dispose of mines laid on regularly used tracks and, in some cases, to place their own in prepared ambush sites. In the close defence of forward bases 'Claymore' horizontal mines were sometimes incorporated, to be detonated on observation from within the perimeter; but, it was found prudent to inspect these daily in

order to ensure that the enemy had not clandestinely realigned them to fire into the position. In general, however, the dangers of indiscriminate minelaying and the difficulty of recording their positions precluded a more conventional use of this weapon on any scale.

The system in force for the supply of engineer stores, already complicated enough by the overlap of responsibility between RE and RAOC, was here further aggravated by the introduction of a third source - of materials used in the construction of major camps falling within the competence of the Ministry of Public Buildings and Works. Accounting was bedevilled not only by the dislocation in changing over from peacetime to wartime procedures, but also by a continuing dichotomy of financial responsiblity for works carried out by way of Civil Aid and in support of Internal Security on the one hand; and, on the other, for those planned to combat the external threat to what were at the outset Crown Colonies and became in the course of operations the Eastern Province of a new Republic, Malaysia.

Works Services in Borneo

Similar problems had been apparent in Works Services. By 1965 it was clear that MPBW were unable to meet their responsiblities in the operational areas of Borneo and using the principles outlined in Chapter 2 an agreement was made under which the CRE would work as MPBW agent in specified areas. Financial and technical powers were delegated to him and to squadron commanders by the Area Officer MPBW. Clerks of Works serving in the Far East in ESSE appointments moved to Borneo on emergency tours and a Specialist Team RE (Construction) was formed out of the Works Section in Brunei to serve the CRE, the Brunei responsibilities being taken over by MPBW. These agreements in Borneo formed the basis of a modus operandi for other operational theatres. The principle of the Military Works Area was agreed on the Borneo model and was shortly to be put into effect in the withdrawal from Aden.

Operationally, however, the Army increasingly dominated the border areas in a series of successful actions, leading on 11 August 1966 to the termination of "Confrontation" and ratification of the Bangkok Agreement. Thereafter began the process of dismantling and withdrawing the British Army presence, leaving Malaysian forces to garrison their newly acquired territories.

In retrospect, many of the lessons learned in Borneo would have been familiar to veterans of Kohima and Imphal who faced similar problems in World War Two; as so often in that theatre the campaign was one of improvisation and personal ingenuity. Undoubtedly, however, the failure to appoint from the start of operations a CRE with a properly constituted headquarters was one of the major mistakes in an otherwise remarkably successful campaign.

Borneo after Confrontation

After operations ceased, one Gurkha rifle battalion, together with a Gurkha field squadron, remained in Brunei at the request of HH The Sultan. This detachment, based at Seria, was placed under command of 99 Gurkha Infantry Brigade in Singapore and the Sappers then came for technical direction under CRE (Ops) FARELF. Over the ensuing two years, a number of tasks fell to the lot of 67 Squadron, among them the construction of a hangar, workshops and office block in Seria, a project notable for the use of a helicopter to lift beams into position at the rate of one every three minutes, and the Temburong road.

In February 1967 agreement was reached between the British Government and that of Brunei for a permanent road to be built as part of a development scheme in the Temburong District. This was financed by the Brunei Government, who also provided 60% of the plant from their PWD resources; other equipment being brought in by RPL from Singapore. Long stretches of the alignment led through swamp - in places more than 30 feet deep - and other sections followed the river bank, carved out of the steep jungle clad hillside. The soil was generally of very poor quality, mostly clay and shale, and there was no handy source of suitable stone. With a working strength at any given time of no more than 60 men, the Temburong highway was finished by August 1968, when the time came for the squadron to be withdrawn to Kluang. 67 Gurkha Field Squadron was thus the last, as it had been the first, field engineer unit of the British Army to be stationed on the island of Borneo in this phase of its history.

Outside Brunei, there was to be no let up, however, in the Survey and Mapping activities. Between 1969 and 1971, for example, the mapping of West Kalimantan was taken in hand in a combined operation in which the Royal Air Force flew air

photo cover, ground control was provided by 84 Survey Squadron working with Australian and local surveyors, computation was carried out by the Mapping & Charting Establishment in the United Kingdom, analytical air triangulation by the Royal Australian Survey, and drawing done by Indonesians. In this way what had two years before been a state of confrontation was succeeded by one of friendly cooperation.

THAILAND

Operation Crown

While the United States became increasingly embroiled in Laos and in Vietnam, mounting pressure was being brought to bear on the British Government, as a signatory of SEATO, to go to the assistance of its Allies; but, this pressure was with equal force resisted in Whitehall. In December 1962, however, the Prime Minister, in anticipation of a meeting with President Johnson, wished the United Kingdom to be seen to be playing some part in stemming the march of Communism on the mainland of Asia without, if possible, becoming involved in the fighting. The Americans were by then simultaneously engaged in a massive programme of Special Logistic Aid to Thailand (SLAT) and participation in this might be acceptable as a token of Allied solidarity; this proposition was accordingly put to C-in-C Far East Command[4].

As the work in North Borneo was then practically finished and the revolt in Brunei had not yet erupted, the advent at this juncture of SLAT was welcomed in FARELF as a potentially fruitful field for further endeavour, offering opportunities to gain valuable experience and favourable publicity for the Services. Of the schemes examined by the Chief Engineer FARELF, the construction of an entirely new MRT airfield for use by SEATO forces appeared the most attractive. The site was at Loeng Nok Tha, near Mukdahan. It was not far from Thailand's eastern frontier with Laos and some 70 miles north of an existing rail and air head at Ubon Ratchathani. In February 1963 this proposal was submitted to Whitehall and came to realisation under the style of Operation Crown.

Authority to conduct even a preliminary reconnaissance was, however, delayed, awaiting Thai Government authority, until

May 1963, by which date the coming dry season (September - April) was uncomfortably close and, more significantly, the situation in Borneo had deteriorated, drastically reducing the availability of men and machines and of transport of all kinds. It was, notwithstanding, agreed to proceed and a team led by CRE SLAT, with a representative of FEAF Airfield Construction Branch, visited the site and produced - in a very short space of time and working in very adverse weather conditions - a proposed design, and a rough estimate of £600,000 for a strip 5,000 feet long and 120 feet wide with 500-feet overruns and 90-feet berms and one million square feet of associated apron and parking space. More extensive reconnaissance was proscribed for fear of prejudicing the negotiations in which HM Ambassador in Bangkok was simultaneously engaged with the Thai Government regarding their contribution to the cost of the works, so that the CRE-designate was constrained to make his early plans on incomplete information and, at first, with no staff.

At last, at the end of November, authority came from London to go ahead and CRE FARELF could release his first Engineer Operation Instruction. Conveniently, the completion of the Commonwealth Cantonment at Terendak had by then thrown up the establishment for CRE (Works) FARELF, which was promptly appropriated to this project and, with effect from 1 January 1964, renamed CRE Crown.

It had hitherto been envisaged that one field squadron would be employed to set up camp and be followed by another with plant and administrative support to build the airfield and that the whole project would be completed over two dry seasons by June 1965. Owing, however, to the delay in starting and the approach of the rains in May, it was resolved to double the initial effort in Thailand with consequent large additions to the accommodation and logistic requirements there. This turn of events had the effect indirectly of securing for Borneo much-needed and long overdue reinforcements which, though repeatedly asked for from UK, had hitherto as often been refused.

Meanwhile, in December 1963, an advance party of CRE Crown was deployed to Mukdahan to begin detailed site investigation work; in particular, to locate construction materials and do a detailed survey of the runway alignment, pre-requisites for confirming or revising the findings of the preliminary reconnaissance team. At the same time, leading elements of 11 Field Squadron established a tented camp on the airfield site. In

January they were joined by the rest of the squadron (including its attached troop of RAE), followed by plant detachments from 54 Corps Field Park Squadron, the RNZE, and from 5001 Airfield Construction Squadron RAF and, in February, by 59 Field Squadron, newly arrived from UK. The composition and organization of Crown force at this stage is indicated on the diagram at Figure 9. Machinery was meanwhile brought up from Singapore by sea into Bangkok, whence it was forwarded by rail and road, which necessitated the strengthening of some of the bridges on the way. Air maintenance, limited because of operational demand from Borneo, was from then on to be a continuing constraint on the movement of men and of urgently needed stores.

The main effort to begin with was applied to the construction of roads, a helipad and the hutted camp for the workforce. Water for the works was from the outset a recurrent problem and had at one time to be hauled from a distance of 18 miles. By April the camp was ready for occupation and 11 Squadron could be released; the plant, working two shifts a day, had cleared the alignment for the runway and removed top-soil to an average depth of two feet to reach sand suitable for cut and fill operations to form the sub-grade, clay in the sub-grade being replaced by sand. The ground was extremely dry and the whole area became covered with dust, making it unpleasant work in shade temperatures up to 108° Fahrenheit. Progress up to this point was well ahead of schedule, but operations were being increasingly interrupted by unseasonal rains and, at the end of May, earthmoving was suspended; water supply had, for the time being, ceased to be a problem. In July, after completing a temporary strip for light aircraft, 59 Squadron repaired to Singapore for a period of rest and re-training.

The initial design produced by CRE SLAT in June 1963 was for a wearing surface of Pierced Steel Planking (PSP) on a base of compacted laterite and sand, 18 inches thick. The top three inches of the laterite were to be stabilized with bitumen to produce a waterproof seal to the pavement. The findings of the more detailed investigation carried out by the CRE Crown technical team from January to June 1964 led to a re-design of the runway pavement. It was found that the locally-occurring laterite, apart from being much less extensive than expected, contained a high proportion of clay. This rendered the material

unsuitable for bitumen stabilization. Also, there were second thoughts about using PSP. The Americans had experienced difficulty with a nearby airfield at Nakhon Phanom surfaced with PSP, where the metal cut the waterproof seal. There was also concern that PSP was unsuitable for the higher tyre pressures being used on modern aircraft and worry about the effect of the metal on electronic equipment.

Revised designs were developed by CRE Crown and the final proposal submitted in October 1964 - well into the second dry season of the project - was for a wearing surface of two inches of bitumen macadam on a base of six inches of stabilized laterite, upon a sub-base of compacted laterite and then sand, giving a total pavement thickness of 22 inches. It was proposed that the base stabilization should be done using both lime and cement and this method was endorsed by the Road Research Laboratory in the UK. The pavement design was approved by the Chief Engineer FARELF and financial approval for an extra cost of £38,500 was given by the Treasury in November.

Meanwhile in August work had been resumed on site, six full days per week, now hindered once more by acute water shortage and by constant breakdowns in the whole range of aging plant. Because some of the materials had to be collected from sources as much as 200 miles distant, when stabilization began it was at times impossible to keep more than one of the four Howard trains in action. However, the runway base was finished by the end of March in the following year and the macadam surfacing by the end of May, when the New Zealand detachment was withdrawn. Determined efforts to beat the monsoon enabled the control-tower, airfield fencing and lighting to be completed in time for an opening ceremony to be performed on 17 June 1965 by the Thai Minister of Defence in the presence of his Prime Minister and the British Ambassador.

It was, however, by now apparent that the cost would overrun the approved estimate by a substantial margin and, furthermore, it would scarcely be possible to finish the outstanding work and evacuate the site by the planned date, 31 October 1965. More alarmingly, it was soon apparent that the airfield was showing signs of failure, with soft patches and rutting. In October 1965, Colonel Engineer Plans (Airfields) in MOD visited Loeng Nok Tha to investigate what residual work was required to reinstate the pavement. In doing his investigation, he identified the most

likely causes of failure. The main reason he found was the porosity of the bitumen macadam. This, coupled with an inadequate cross-fall, allowed water to be retained as if in a sponge, from whence it filtered down through cracks and imperfections in the stabilized base to soften the laterite sub-base below, sufficient to cause failure.

With the benefit of hindsight, it is possible to catalogue many contributary causes of failure. For reasons of economy, the bitumen macadam was very much a marginal design. It could have worked, but the aggregates used were of a poor quality due to local circumstances and the mixing plant was too old and inadequate for the task. The result was a macadam that looked fine when laid but which "stripped" (bitumen/aggregate adhesion failure) when wet. The inadequate cross-fall accentuated the problem. The stabilization generally worked very well, but there were many problems with equipment serviceability, no doubt compounded by the remote location, and the equipment operators were not very experienced. There were doubts too about the quality of the local cement. It was to be expected that there would be minor imperfections in such stablized bases and a waterproof seal was essential. The laterite used for the sub-base was of a very variable quality; comprehensive laboratory testing had indicated a reasonable bearing capacity for this layer, but in the event, the material as laid proved far weaker. Desirable field trials could not be carried out because of time constraints; the percolating water guaranteed failure.

Pending the outcome of technical enquiries, the whole question of SLAT, and of Crown in particular, came under review at high level, with certain circles in Whitehall pressing for a decision to cut the losses and clear out of Thailand as quickly as possible. This unsoldierly proposition was, however, most strongly resisted by the E-in-C, contending with eventual success that, quite apart from political and military considerations, the Royal Engineers should be allowed the opportunity to retrieve their fortunes, to regain confidence in themselves and to restore their reputation in the eyes of the Royal Air Force. This latter was particularly important as the assumption of responsibility for airfield construction by the Royal Engineers from the Royal Air Force was at its height just at this time. Miraculously, the "political uncertainties" so feared by the FCO faded away, the

Treasury found the funds to finance a complete reconstruction and orders went out in October 1965 for this to be taken in hand.

In November, 11 Field Squadron took over from 59 Field Squadron the ongoing works, while the latter moved back to Singapore for re-training. Meanwhile, a new batching and mixing plant was ordered and brought up in time to be taken into use by 59 Field Squadron on their return in May 1966. The resurfacing sequence involved stripping the black top, ensuring that the underlying stabilization was intact, or repairing it where necessary, and then placing an 8-inch layer of pavement quality concrete (PQC). In this phase, the force found itself fully stretched with two concreting parties working alternate 8-hour shifts and others employed on associated and secondary tasks, which included laying black top shoulders, re-turfing, runway and taxiway marking, cutting and sealing joints in the pavement, besides normal camp services and administration. The task was, notwithstanding, all but completed by October, when 59 Squadron had to be taken off the project to assume its new role in support of 3 Commando Brigade, Royal Marines. By then, 11 Squadron was engaged elsewhere, including Vientiane in Laos, whither a detachment had been sent to assist in flood-relief operations. The "Confrontation" in Borneo was, however, then seen to be coming to an end, so 34 Field Squadron, which had arrived in Singapore in September from UK to take part there, was deflected to Thailand to finish off the work. When, in December 1966, the reconstructed airfield was finally proved and handed over, CRE Crown was dissolved, some of its staff going to join the headquarters of CRE (Ops) FARELF and the Establishment cover being transferred to 63 CRE (Construction), which opened in Singapore in January 1967.

Thus ended the not altogether happy saga of Loeng Nok Tha. With so little by way of preliminary investigation, the bold decision to proceed was from the first fraught with risk; yet, the risks most feared were - as is often the case - not those that materialised, while the circumstances which led so nearly to failure were at once unpredicted and unpredictable. In the event, no lasting damage was done, for, as the operation neared its end, negotiations were already underway with the Thai Government under which a similar workforce was to remain for a further year to undertake, under the code name Post Crown, road

construction and other development projects in the same district.

Post Crown Project

The original suggestion made in September 1966 to the Thais was that a road should be built North West from Loeng Nok Tha to a village some 25 kilometres away called Ban Khok Klang. Such a road would provide access in all weathers for several hitherto isolated communities, while at the same time contributing materially to the internal security of an area open to communist incursions from across the nearby Mekong river. The Thai Government agreed to pay for and deliver to the site all construction materials, and provide civilian labour; the British were to provide plant and project control staff. The alignment - after several revisions - was finally fixed in November and work started in earnest on 2 January 1967.

The initial target of 25 kilometres had been fixed largely because it had been assumed that the Force would have to leave Thailand at the end of 1967. However, in August it was agreed that the British could remain until 1 May 1968 to extend the road westward from Ban Khok towards Nong Phok, some 14 kilometres away, if the Thais extended their existing road from there eastward to meet them. In the event, the link was completed by a combined British/Thai force, under British command, working West.

Control of the project was exercised under CRE(Ops) (FARELF) by each OC of the squadron deployed to the task at any one time, who had additional staff including a Thai liaison officer and the FARELF Air Troop RE in support. The main base camp remained at the Crown site, with a forward construction camp at Hong Khong.

34 Field Squadron, having completed its tasks on the airfield, began work on the road in December and was relieved by 59 Field Squadron in May 1967. In August, 59 Field Squadron was duly relieved by 11 Field Squadron who bore the full brunt of the monsoon. By the end of December - when the original 25 kilometres of road would have been finished - no other unit was immediately at hand to continue the rotation. Accordingly, from January 1968, a composite workforce made up from 54 (FARELF) Support Squadron and one troop each from 51 (Airfields) and 59 Field Squadrons, took over and, with the

Air Troop still overhead, brought the extended project to completion.

The 40 kilometres long road was formally declared open on 18 April 1968. An impressive ceremonial was mounted by 54 Support Squadron marching past in white No 3 Dress and comparing favourably with a smart detachment of the Royal Thai Army brought in for the occasion.

Since the people of Loeng Nok Tha had virtually no experience of operating or maintaining any form of machine, the development of water supplies in the surrounding villages began with the provision of hand pumps drawing from shallow wells; but, towards the end, a start was made to introduce a more advanced system, putting down 200 feet deep wells, with electric pumps powered from diesel generators, in association with limited piped distribution and water towers built by the villagers themselves. In this and in other directions training the inhabitants turned out to be a rewarding by-product. Two of them quickly mastered the procedure for setting out, unsupervised, straightforward sections of road alignment; the 15 bridges (some of five or six spans) were built by teams of two sapper carpenters and 12 Thais, and the 1,700 reinforced concrete pipes required for the 93 culverts were manufactured entirely by villagers under the supervision of a sergeant of the Thai Army; up to 200 were engaged to work on the road, not all on unskilled tasks. Numerous subsidiary projects were carried out by the Sappers - not infrequently in their off-time - with the grateful cooperation of the local populace, before the last of them left the district in November 1968.

Other Projects

The friendships forged at Loeng Nok Tha blossomed into yet another programme of projects in another part of the country. In October 1969, an ad hoc Specialist Team RE (Thailand) under 63 CRE (Construction) was formed. A combination of geological, political and administrative considerations led to the STRE being based at Chom Bung, near Rat Buri and some 50 miles from Bangkok, where it was occupied principally with well drilling and water supply installations, but also with building schools. By the time its programme had been completed in September 1971, the team had drilled eight wells, the deepest of which was 236 feet.

HONG KONG

Operations

Throughout the years covered by this volume, the border with Communist China continued to dominate the political scene, but emphasis had shifted away from the forward line of defensive localities, which had previously influenced operational philosophy. Police now occupied a frontier strip two or three miles deep from which the Army was almost totally excluded, while the defence works on which the garrison had laboured in the 1950s lay largely abandoned.

The Spring of 1966 was marked by rioting in Kowloon - a spill-over from Mao Tse Tung's Cultural Revolution - which shook the garrison out of its peaceful routine. From 6 to 11 April, 69 Gurkha Field Squadron was held at readiness in brigade reserve and on three nights was called out to assist the Police in enforcing curfew in the Old City.

Of the succession of demonstrations and riots, of stoppages and strikes, which accompanied the so-called "Communist Confrontation" in Hong Kong between May and December 1967, the brunt was borne by the Police. In the sensitive area of the frontier it was at first mainly a unilateral war of propaganda waged from the Chinese side; there was from first to last no involvement of the Red Army, and no violence until 24 June when a mob attacked the Police Post at Sha Tau Kok and had to be dispersed with gas shells. Firearms were first used in a second attack on the same place, in which the Police suffered serious casualties and had to be relieved by a unit of Gurkha Rifles. In support was 69 Gurkha Field Squadron, who were employed on rehabilitation tasks in the village, in providing accommodation and water supply for the troops and in erecting obstacles and protective screens. During August, the situation on the border deteriorated and the squadron was assigned the tasks of demolishing the police post and other government buildings at Man Kam To, and erecting chain link fencing to facilitate crowd control. Other operational tasks which came their way included the building of reinforced concrete walls and fire positions, a bunker and grenade emplacement at Lo Wu and tracks leading forward to company and platoon localities. In this phase over 7,000 anti-personnel mines were laid to cover infantry and police outposts. The biggest project during these months was,

however, the erection of a continuous belt of wire, 20 miles in length, from Sha Tau Kok in the East to Lak Ma Chau in the West. This obstacle, known as the Snake Fence, consisted of two parallel and touching high apron fences infilled with four lines of Dannert coils.

In September 1967, 69 Gurkha Squadron was reinforced from Kluang by a troop of 68 Gurkha Squadron and, by the end of October, the Snake Fence was finished and the job of repairing the existing chain link fence along the rest of the border could be taken in hand. There then began a programme of constructing semi-permanent accommodation for the infantry at five of the forward positions. These tasks were not completed until February 1968, when all the minefields had to be lifted and a start made to surface, with an 8 foot wide concrete pavement, 7,000 yards of track cut when the Snake Fence was being built.

Once the Army had assumed control in the border area, the Government proceeded to take the initiative in the cities, and 69 Gurkha Squadron was called upon to find demolition parties to accompany police raids on known communist strongholds and to assist by blowing in steel doors and other obstructions. In addition to all this, all officers and senior NCOs of the squadron gained plenty of experience in bomb disposal in the course of the 354 incidents recorded in the New Territories. In the cities and villages, violence continued almost daily up to the end of December 1967, when it suddenly ceased and the "Confrontation" collapsed.

Following the reinforcement, mentioned earlier, of the Engineer Park in November 1968, it became possible to undertake a survey of the border defences and to prepare estimates for regular maintenance of the essential works. This survey was made under the direction of a Sapper officer, who was responsible also for the design of a vast concrete bunker - affectionately known as "Mao's Tomb" - and for overseeing the building of it at the important frontier post at Sha Tau Kok.

During the Seventies the problem of Illegal Immigrants entering Hong Kong escalated considerably. They included not only Chinese crossing the border from Kwangtung to the "prosperous West" in the shape of Hong Kong, but also "boat people" fleeing Communist rule in the wake of the Vietnam War. To stem the flow from China much work was done to improve the policing of the border, including road construction and the

continual maintenance of Snake Fence. Other work included the provision of watch towers in the Mai Po marshes, clearing infantry company base sites at Castle Peak and a hovercraft landing facility at Stonecutters Island.

As for the "boat people", the authorities had no option but, in view of the desperate state in which many arrived, to receive them. As part of this policy in 1976, 68 Gurkha Squadron were tasked with providing domestic and security lighting, water supply, showers, latrines, access road and hard standing at a camp for 2,000 refugees, all within 24 hours. 1979 saw the deployment of a Gurkha Field Force on anti-Illegal Immigration operations and the formation of a QGE boat troop to patrol against swimmers, junks and sampans around the clock and to assist the logistic support of outlying islands.

Projects

To improve relations with the more remote communities in the New Territories, units of all arms were, in the early 1960s, employed on so called "Penetration Patrols" , which threw up for the engineers numerous minor tasks. For example, British, Chinese and Gurkha Sappers were engaged at different times in bringing supplies of fresh water to the offshore islands of Wong Wan Chau, Ap Chau (Dick Island) and Tap Mun Chau (Robinson Island) by means of dams, storage tanks, and pipe lines with sections from 500 to 2,500 yards in length laid upon the seabed. The method employed was to boom out 2½ inch galvanized iron pipe in pre-assembled 60 foot lengths suspended from sampans propelled by Chinese fishermen. In 1965, 67 Gurkha Field Squadron completed a mile of causeway, including two small crib bridges, across the Mai Po marshes, giving access to the police station at Pak Hok Chau and settlements in that district.

A later, more extensive project was the Luk Keng Road, built to give access to Starling Inlet in the extreme north east of the New Territories. The section to be built by the Army branched off from the existing East Coast route at Tai Mei Tuk and penetrated rugged terrain for a distance of four miles as the crow flies, a tortuous alignment demanding heavy cut and fill and the construction of a number of massive culverts; beyond Wu Kau Tang considerable rock blasting was necessary and the work was assigned to the PWD.

Work started in February 1969, and was to continue for three

years, providing occupation (in addition to the engineers stationed in Hong Kong) for a succession of visiting field troops and detachments of plant operators from the squadrons in Singapore and Malaysia - until the evacuation of those places in 1971 made them no longer available. Design, project control and heavy plant support were throughout to remain in the hands of the Hong Kong (latterly 54 (HK)) Support Squadron; helped by a host of Chinese coolie women, the following units took part at various times:

11 Independent Field Squadron
54 (FARELF) Support Squadron
59 Field Squadron
67 Field Squadron, Gurkha Engineers
68 Field Squadron, Gurkha Engineers

From late September to Christmas of 1971 men of 34 Field Squadron (and Plant Troop, 6 Field Support Squadron) from Tidworth in the UK were employed on Lantau Island on community relations projects. The primary aims were to provide domestic electricity for several villages including Pak Mong and Ngau Kwu Long; to extend the main jetty to accommodate craft of six feet draught at low tide, and to enlarge the playground of a local school. The squadron base camp was at Fanling, a 45 minute drive from Gordon Hard at Castle Peak Bay and from here the work force was delivered to the island by the RCT. Stores were moved to site by use of Wessex helicopters from HMS *Albion*.

The electrical requirement stated that each dwelling should have one power and two light sockets, power for which was to be provided by a 12.5 kVA generator at Pak Mong and a 20 kVA generator at Ngau Kwu Long, with distribution by means of overhead cables and on telegraph poles. At the playground site the requirement amounted to a move of some 1500 cubic yards of earth, for which a Drott and a Ferguson LWT were stripped, flown in and reassembled on site. The pier extension was hampered by the interference of three separate typhoons but was completed on time, and all three projects were opened by the Commander 51 Infantry Brigade on 9 December 1971.

In May 1973 work started on the Castle Peak Ranges Project in which 68 Gurkha Field Squadron was tasked with building

an anti-tank weapon moving target range, the design and earthworks having been completed previously by 54 (FARELF) Support Squadron. Stores were delivered to the almost inaccessible site by 30 mules, each with a Chinese handler, from 414 Pack Troop RCT, which imported cement, sand and aggregate in ammunition boxes strapped to the animals' sides. Heavier items such as timber and water were ferried to site by Wessex helicopters, and the system worked well, except when both means arrived on site together when the mules took exception to the noise and were inclined to bolt back down the hill. By 1976 a 100 metre SMG and zeroing range and a hard targetting range complete with access roads had been completed.

While this work was going on at Castle Peak, 67 Squadron were occupied in another range project at Fanling. The aim was to produce a 300 yard gallery rifle range next to the existing 600 yard San Wai B Range, with only the minimum safety arc of 11 degrees. On 15 April 1973 work began on the access road and on a drilling survey of the area to locate rock near the surface. Unusually, it was not possible in this instance to site the range in a valley; consequently large earthworks and drainage were required, including a culvert 315 feet long consisting of two 2 foot 6 inch diameter concrete pipes to drain a neighbouring 30 acre paddyfield. The task was badly hampered by the weather (all but six days being lost in August) but was eventually completed in January 1974, by which time some 15,000 cubic yards of earth had been moved and 1,000 tons of concrete poured at a material cost of £16,000.

Disaster Relief

Though violent storms are commonplace in the Far East, for Hong Kong 1964 was remarkable because a succession of four typhoons struck the Colony in three months. The first, on 8/9 August, caused general havoc including a serious landslide at the Government Resettlement Area at Kwun Tong, which the wheeled tractors of 67 Gurkha Squadron went to clear with the PWD. On 6 September, the second typhoon arrived and departed, leaving behind widespread flooding and destruction, with fresh landslides on the Castle Peak road; once again the Sappers were called out in force. The third storm in this series, three days later, did little but hinder the making good of the damage done by its predecessors, but the last storm on 12/13

October, brought more work for the squadron. The heavy rainfall led to large landslides at several points on the Castle Peak road between Tai Lam and Tsun Wan. A medium wheeled tractor, two light wheeled tractors and one field troop were deployed throughout 13 October and single lane traffic was reopened fairly quickly. Later in the afternoon a further very large earth slide approximately 100 feet long and 10 feet high occurred, but single lane traffic was again restored by 2130 hours by two light wheeled tractors working with the PWD.

A similar emergency arose in June 1966 when unusually heavy rains resulted in much flooding and many landslides. 69 Gurkha Field Squadron Headquarters and two troops went to Victoria to tackle the task of extricating 70 cars from a tangled heap enveloped in 3,000 tons of mud and sand. While this was going on the rest of the squadron was busy with the help of 1/2 Gurkha Rifles propping up a bridge near Shek Kong and at the same time, in cooperation with the Royal Warwickshire Fusiliers, rescuing civilians stranded all over the New Territories. All routes from Kowloon to Tai Po and Castle Peak were cut, so the detachment from Hong Kong was obliged to return by sea and the ensuing six days were occupied by the entire squadron working round the clock to restore communications.

Late in the afternoon of Friday 16 June 1972, the first call for engineer assistance was received from the civil authorities, who were attempting once again to cope with the damage incurred from very heavy rains. This time the task was to clear a boulder, some 18 feet in diameter, which was blocking the only road to Stanley. B Troop, 67 Gurkha Squadron left Bowring Camp at 0500 hours on Saturday, meeting a Plant detachment from 54 (FARELF) Support Squadron (diverted from another project) on the way. A special ferry and police escort enabled the convoy to reach Hong Kong Island by 0645 hours, but roads blocked with traffic resulted in a delay in reaching the site until 0900 hours. Eleven one pound borehole charges were placed inside the boulder, three five pound charges underneath and further charges in the hillside to bring down loose material. The charges were successful and the road reopened on Sunday morning. The rain increased, however, and at Kun Tong, not far from Kai Tak International Airport, 10,000 tons of sliding earth engulfed a squatter estate burying some 60 people. 54 Squadron were tasked to supply lighting equipment and a 10 ton crane to assist in the rescue operation.

Soon after dark that day another huge fall occurred in the densely populated area of Hong Kong City known as Kotewall Road. The slip had engulfed one two storey and one four storey building, and in turn this mass collided with a twelve storey building, toppling it over and down the hillside, slicing, as it fell, the top four storeys off an adjacent one. Men from 54 Squadron, already on standby for Kun Tong were immediately diverted to this new disaster. Some 30 survivors were extracted that night, with the Squadron achieving magnificent feats, many of them by borrowing plant from all over the island. The scene that met the rescue workers at dawn was one of crushed and twisted ceilings, floors and walls with reinforcing bars protruding, and amongst the wreckage the contents of more than forty homes and the bodies of many of their occupants. That morning the rescue operation was reinforced by men of 1 Troop 68 Gurkha Squadron under command of OC 54 (FARELF) Support Squadron who coordinated engineer effort at both sites until Kotewall Road was handed over to OC 67 Gurkha Squadron later that morning.

GILBERT AND ELLICE ISLANDS

Coral Reefs

In 1960 the Colonial Office sought the help of the Army in improving the means of exporting local produce from the Gilbert and Ellice Islands, which consisted of about 35 atolls with a total land mass of no more than 360 square miles, but scattered over two million square miles of sea and divided both by the Equator and the International Date Line.

Most of these atolls were surrounded by flat fringing reefs of coral, exposed at low tide and covered by very few feet of water at high. The proposition was to form channels through these reefs, making it possible for surf boats to work at all states of the tide, thereby allowing a faster turnround of ships loading copra. A reconnaissance was made in July and August 1960 by a Royal Engineers team of Major D G Raschen and WO2 J T Cheeseman, who visited seventeen atolls and with subsequent experiments learnt about possible techniques.[5] As a result, a volunteer party of two officers and six NCOs drawn from 36 Corps Engineer Regiment at Maidstone, under Captain T P Hardy, travelled by air early in 1962 to Tarawa. In March work

began, and in the ensuing nine months new channels were made - or existing ones improved - at thirteen islands, in addition to clearing underwater obstacles and removing coral heads in lagoon anchorages at three others. The average length of new cut was 500 feet, the depth three to four feet below reef level, and the width of channel 15 to 20 feet. In all, more than 20 tons of high explosive was expended. By Christmas of the same year the team was back in England.

Airfield Construction

There were at this time on the Gilbert and Ellice Islands only two airfields, one at Bonriki on Tarawa, and one on Funafuti in the southern group. In January 1968, Major B O Bown was seconded to supervise the building of several more as part of a scheme introduced by the colony's administration with a view to improving communications between the widely dispersed communities of which it was composed. His first task was to create from the limited local resources of material and skilled manpower the nucleus of a self-sufficient construction unit; unskilled labour would be taken up on a casual basis on each island. In due course, the team assembled at Betio, to be embarked together with some 300 tons of machinery and stores, in three vessels and landed on Abemama on 26 April.

The chosen site - that of a wartime American airstrip - was found to have been replanted with coconut palms, whose dense root mat had to be removed before reconstruction could commence. Thereafter, a dragline stationed in the lagoon dredged mud from the sea bottom, which was transported to the site by trailer and there spread by bulldozer to a depth of six to eight inches over a compacted foundation of coral sand, then rolled, and finally levelled by motorized grader. The finished product presented a cleared strip 5,000 feet in length and 300 feet in width with, in the centre, a runway of hardened lagoon mud 4,700 feet long and 100 feet wide connecting at one end with an aircraft parking area. A rest house and a small waiting, or terminal, building, both made of local materials, completed this project which was formally opened by the Acting Resident of the Colony on 20 August 1968.

The team moved next into the southern Gilberts, to North Tabiteuea, where the choice of sites was extremely limited. A practicable location having, however, been agreed upon, work started on 24 September and was completed on 3 March 1969.

The airstrip, similar in construction to that on Abemama, but necessarily shorter, was declared operational during a tempestuous storm which not only threatened to shipwreck the Resident Commissioner on his passage to perform the opening ceremony, but also prevented the landing of the inaugural aircraft. Some weeks later, however, the internal service, based at Bonriki, was flying twice weekly to Abemama and Tabiteuea. The inhabitants, who claimed never before to have seen a flying machine, saw in all this the fulfilment of an ancient prophecy; as a result their Island Council named the scene of these miracles Bown Field.

Having finished their task on Tabiteuea the unit, together with their wives and children, grandmothers, pigs, chickens and dogs, repaired to Tarawa to overhaul their equipment while carrying out some much needed repairs to the roads on that island and to the runway at Bonriki. Early in July, they set out once more, this time for Butaritari in the northern group of islands. There, work proceeded according to plan and an airfield of similar dimensions and construction to that made at Tabiteuea was duly opened by the Head of the Foreign & Commonwealth Office Pacific and Indian Oceans Department on 12 November 1969. The local air service promptly extended its schedule to include Butaritari; and the unit, by now confident in its own competence, returned to Tarawa.

The strip at Bonriki, made by the Americans in 1944, had seriously deteriorated over the intervening years. It was now necessary to remove entirely the existing surface - 7,000 feet by 300 feet in extent - and to replace it to a minimum thickness of six inches with lagoon mud well compacted and graded to suitable camber. The quality of mud at first available proved too poor to harden satisfactorily; but, after this false start, better material was forthcoming and the work was duly finished within twelve months without the strip having been wholly out of use at any time.

The second major project remitted to the OC (by then Major J H Alexander) was to supervise the making of an embankment across the corner of the lagoon at Temaiku, not far from the Bonriki airfield, with the object of reclaiming nearly 800 acres of land, representing an increase of ten per cent in the total cultivable area on Tarawa. The six foot high embankment was to be 7,000 feet in length, 60 feet wide at base and 28 feet at the top and was planned to carry a 22 foot wide carriageway. The

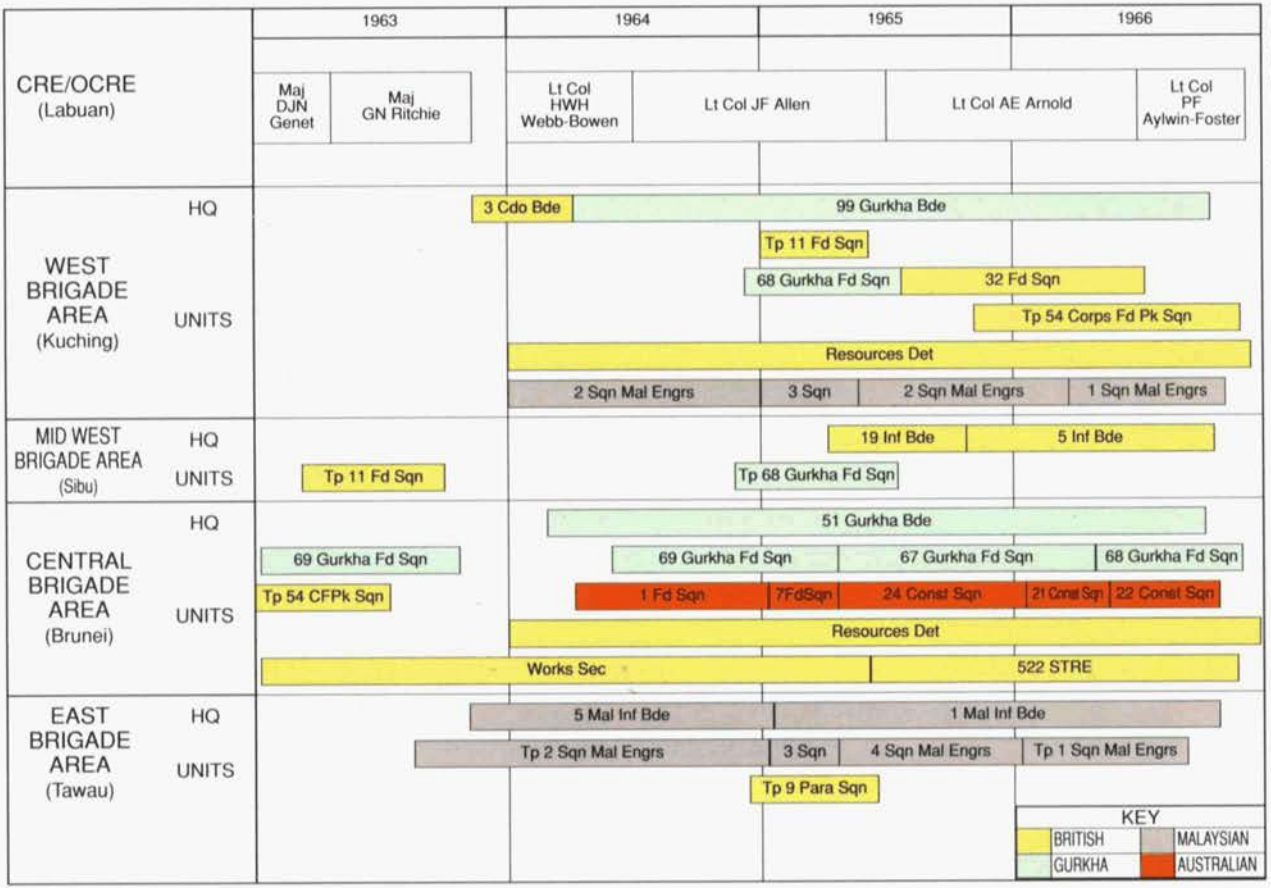
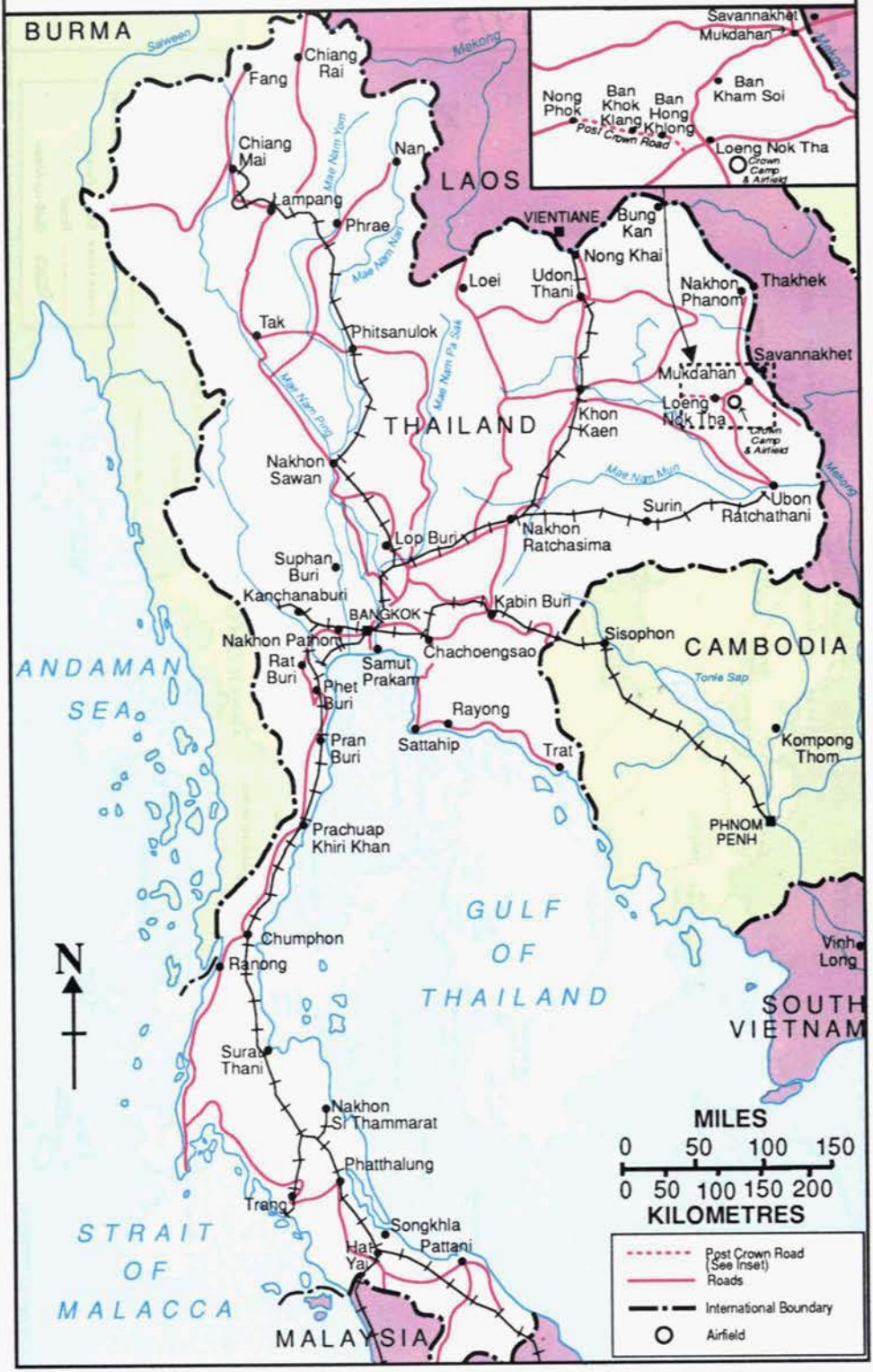
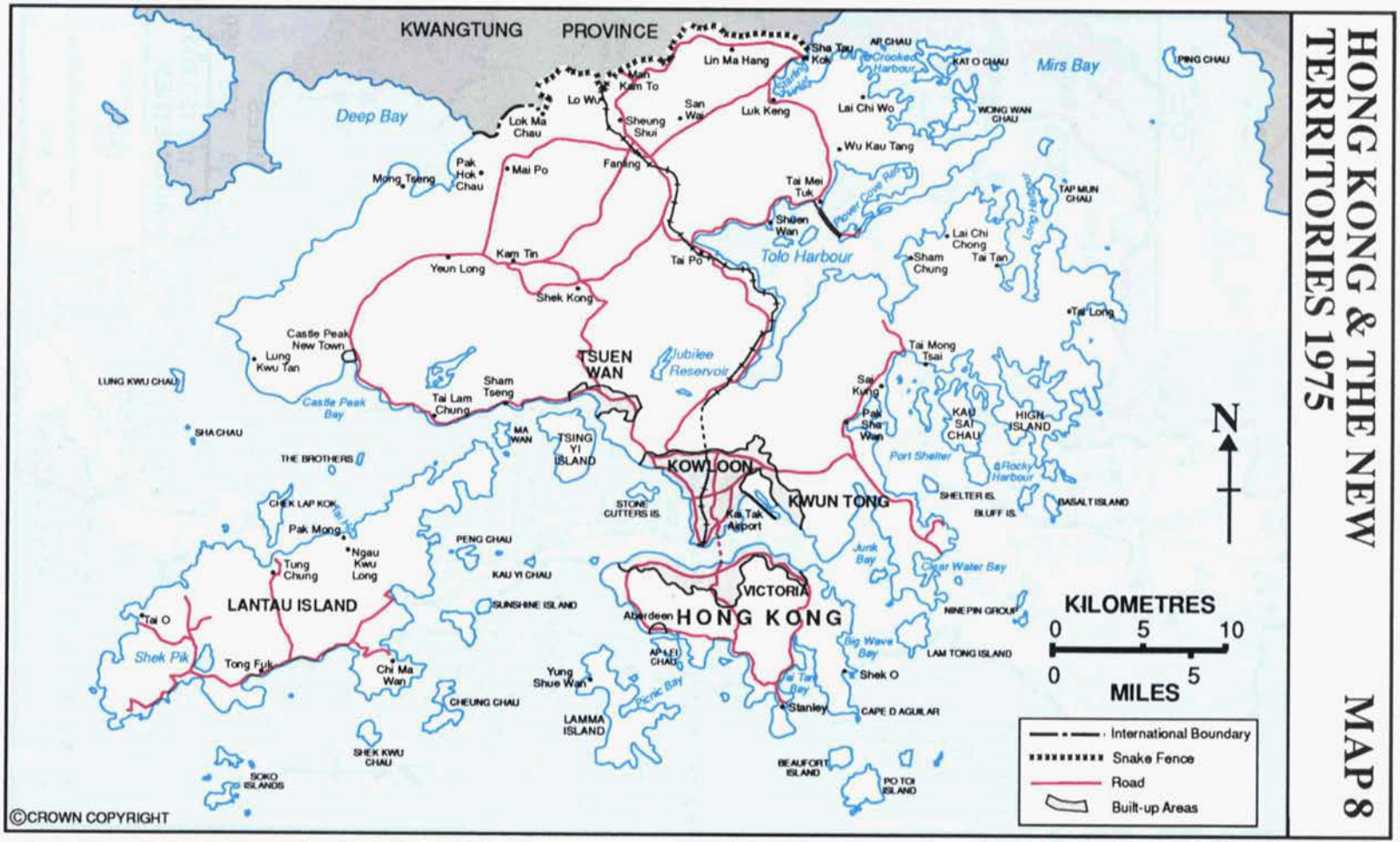


FIGURE 7. ENGINEER DEPLOYMENT IN BORNEO OPERATIONS

THAILAND 1968

MAP 7





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HONG KONG & THE NEW TERRITORIES 1975

MAP 8

land reclaimed would presently be planted with coconut and casuarina trees, the latter to reduce in due time the Colony's dependence on imported timber. These and several minor projects were duly completed before Major Alexander left, without relief, in January 1971.

SOLOMON ISLANDS

Meanwhile, an opportunity presented itself in 1967 for the Corps to contribute to the commercial development of the Solomon Islands, an archipelago situated in the West Pacific Ocean off the eastern end of New Guinea and administered since 1893 as a British Protectorate.

Plans were in hand to rebuild a wartime airfield, Henderson Field, to international standards and, as no suitably qualified PWD engineer was available, application was made to the Ministry of Defence for RE assistance. Thus it came about that, in September 1967, a detachment of one officer (Major F J Otten) and two staff sergeants (one Clerk of Works (Construction) and one Military Plant Foreman) was despatched from UK to Honiara, on attachment to the PWD, to plan and supervise the project. By December 1968, after twelve months' work, the task was three-quarters finished and at this point Major Otten handed over to Major M G Hunter, who brought the project to completion at a cost of approximately £73,000.

While this was in hand, requirements arose for subsidiary airfields and for a wharf on other islands of the Protectorate, as well as for roads, water supply and buildings and for training operatives in the PWD workshops and in the Survey Department, resulting in the formation in 1969 of the Specialist Team Solomons. The STRE worked with the PWD, using PWD plant and local labour; the cost of the airfields and of the wharf were borne by Commonwealth Development & Welfare (CD & W) funds; combined United Nations Children's Fund (UNICEF)/ PWD projects embraced a water supply scheme and the supervision of contractors building a hospital, Government offices, Court House, Police Station and a number of quarters in Santa Cruz.

When the airfield at Honiara was almost finished, that project was extended to provide surface treatment of taxiways and apron, new access roads and improvements in the terminal area,

including a car park, additional buildings, drainage, water supply and new premises for the internal airline. Simultaneously, work was begun on coral-surfaced airfields at Santa Cruz 400 miles further West, at Taro Island in Choiseul Bay and on the tiny Ballalae in the Shortlands Group in the far North. Throughout these projects, logistics were a limiting constraint, due to the infrequent and inadequate inter-island shipping service and to the fact that delivery from UK took at least a year. Spares became a very real problem and the proper utilization of plant was further inhibited by the restricted number and range of equipments at the disposal of the PWD.

As the original tasking neared its end, numerous other projects presented themselves, and agreement was reached for the life of the Team to be extended beyond the term of two years fixed in the first instance. Work included the completion of an airfield started in May 1971, on Fera Island adjoining Santa Isabel, and a variety of tasks on Malaita, where the STRE in effect took over all the functions of the PWD, among them the replacement of existing Bailey Bridges over the principal waterways on Guadalcanal by permanent reinforced concrete bridges. The STRE Solomons was redesignated a Management Team, progressively reduced, and finally withdrawn at the end of 1974.

PAKISTAN

On 13/14 November 1970, a 120 mph cyclone and tidal bore caused extensive flooding of the Ganges Delta, resulting in widespread damage and distress in East Pakistan. An amphibious force from 3 Commando Brigade, with 59 Field Squadron under command, was promptly mounted in Singapore and despatched, under the code name Burlap, to render assistance. The Army and Royal Marines contingent numbered 600 of all ranks, of which 170 were Sappers. Embarked in HMS *Intrepid* and *Triumph* they arrived off the disaster area on 24 November. Meanwhile, the CRE (Lieut Colonel B R Lamble) had gone ahead by air to Dacca, taking with him some assault boats and outboard engines as a gift to the Government of Pakistan, and had, not without difficulty, established contact with the local authorities and made a preliminary appreciation of the situation.

As a result, Burlap was assigned an area of operation centred on Patuakhali containing a population of 1.6 million, in which the only practical means of movement were by water or by air. Immediately on arrival, 59 Squadron was deployed on the preparation of landing craft bases and in distributing foodstuffs - mostly rice and cooking oil - by assault boats working in conjunction with the Royal Navy's LCMs.

It had been assumed in Singapore that the tidal wave would have salinated all the wells and reservoirs and that the supply of potable water would therefore present a major problem. It was found, however, that the massive flow of the River Ganges had displaced entirely the salt sea water for some distance offshore and that the cyclonic wave had, in fact, been fresh. Nevertheless, the risk of contamination remained and the Sappers were called upon to sink several deep tube wells and to repair others in order to ensure a safe supply. A number of other tasks came their way in the restoration of public utilities, such as the repair of electricity cables and generators, while a continuing burden was the disposal of the dead. Finally, certain essential building construction works were taken in hand, the largest of which was a timber and corrugated iron hostel over 200 feet in length for the Kepupara College. The site for this building was reconnoitred on 27 November, the structure was prefabricated on board HMS *Triumph*, conveyed ashore by LCM on 1/2 December and completely erected by 9 December.

The CRE remained in Dacca throughout, monitoring progress by helicopter and in constant touch with GHQ through a detachment of Royal Signals stationed on the roof of the Deputy High Commissioner's Office. With the situation once more under local control, the force re-embarked in HMS *Intrepid* and the LSL *Sir Galahad* on 11 December and dispersed in Singapore on 15 December 1970.

VALEDICTION

The twenty year period with which this volume is concerned saw a complete transformation in the Far East theatre. In the early 1960s there had been a huge British military presence, well established with a full panoply of families, schools, welfare and recreational facilities, scattered throughout a vast area stretching from Thailand and Hong Kong in the North to the Solomon Islands in the South, and along 2,000 miles of the Equator from

Malaya and Borneo to the Gilbert and Ellice Islands. By 1980 this whole structure had been dismantled leaving only a small residue of units in Hong Kong and Brunei. The Corps assisted materially in the ringing down of the curtain on this era of military history, and to this day over the length and breadth of the abandoned territories, the graves of Sappers signpost the ways by which it went; a doleful rearguard watching over the works on which it laboured. Much will inevitably be reclaimed by Nature, from whom it was so hardly won, but a prodigious amount will remain to present a fitting monument to the service of generations of Royal Engineers over many decades in the development of those distant and characteristically intransigent foreign fields.

FOOTNOTES TO CHAPTER VI

1. Maximum realism was not always achieved without difficulties. Brigadier P F Aylwin-Foster recalls how as CRE (Ops) in a fit of enthusiasm in an early post-Borneo exercise in Malaysia he ordered two real craters to be blown in the runway of the airstrip round which much of the exercise play revolved, instead of the minor debris and considerable white tape usually used to represent such obstacles. Unfortunately, the charges blew through the pavement into the stinking mud below leaving two quite disgusting craters requiring major works to repair. Within minutes of the assault wave arriving word reached headquarters that some irresponsible idiot had actually destroyed the runway, and the RAF could not possibly land on it. Prodigious (rather than notional) efforts by the participating field squadron during the night resulted in the completion of repairs by first light when the fly-in began in accordance with the exercise schedule. In a heated umpire washup that evening the RAF pointed out that "aircraft were expensive, pilots' lives precious and airfield runways sacrosanct, and when they took part in exercises they did not appreciate damn fool pranks - if the Brown Jobs wanted to dig useless holes only to fill them up again they could do that somewhere else".

2. Named after Major D H Bowen MBE, OC 68 Gurkha Independent Field Squadron.

3. Named after Captain J C Murcott, 2IC 68 Gurkha Independent Field Squadron.

4. There was already at this time a contingency plan for 28 Commonwealth Brigade to be deployed to Thailand, should the political will at home require it, to assist in countering any external military threat to that country. Parts of this plan included the setting up of a forward maintenance area at Ubon and the preparation of a landing site for seaborne heavy equipment for emergency use should the port facilities in Bangkok not be available. 54 Corps Field Park Squadron was responsible for construction of both these sites and major

exercises were held annually, usually on the east coast of Malaya at representative locations such as Kuantan and Kota Bahru, to practise the resupply procedures with the RAF, RCT, RAOC and REME units involved. Opportunities to visit the actual areas were few, but Major H F MacSwiney recalls how he and the editor were sent to confirm the suitability of the operational landing site at Chachoengsau. Having been hurriedly extricated from the house of ill repute in Bangkok into whose sleazy portals they had initially been booked by the Embassy under the mistaken impression that it was a hotel, and accommodated instead by a hospitable Military Attache and his wife, the pair eventually found the recommended docking location only to discover that it was on the west bank of the river while the road was on the east, and what appeared to be a magnificent reinforced concrete bridge connecting the two might survive the passage of a Class 12 road roller but certainly not that of a tank. "Time spent in reconnaissance....."

5. Colonel D G Raschen recalls that on arrival in Tarawa the pair were greeted by a headline in the colony newsheet "Reef Blasting Experts Arrive". Neither had, actually, at that time ever blasted any coral.

FIGURE 8 ORGANIZATION OF RE UNITS IN FARELF 1961

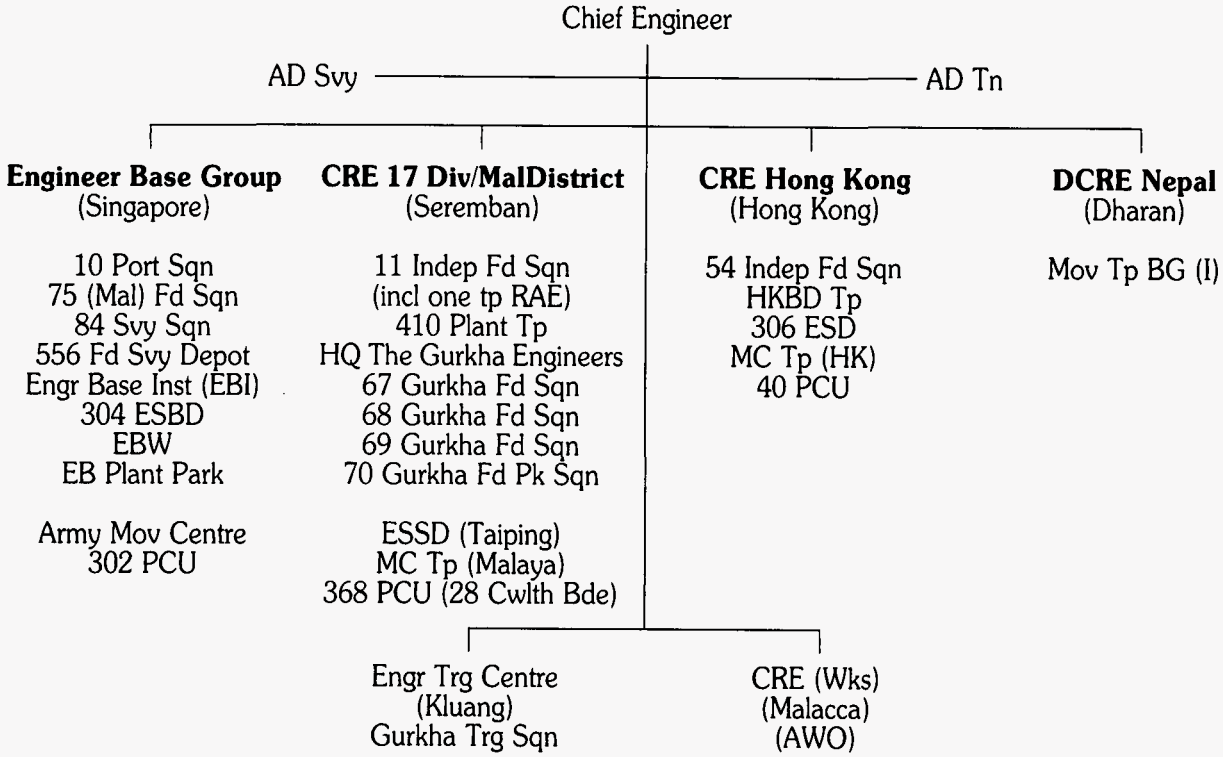
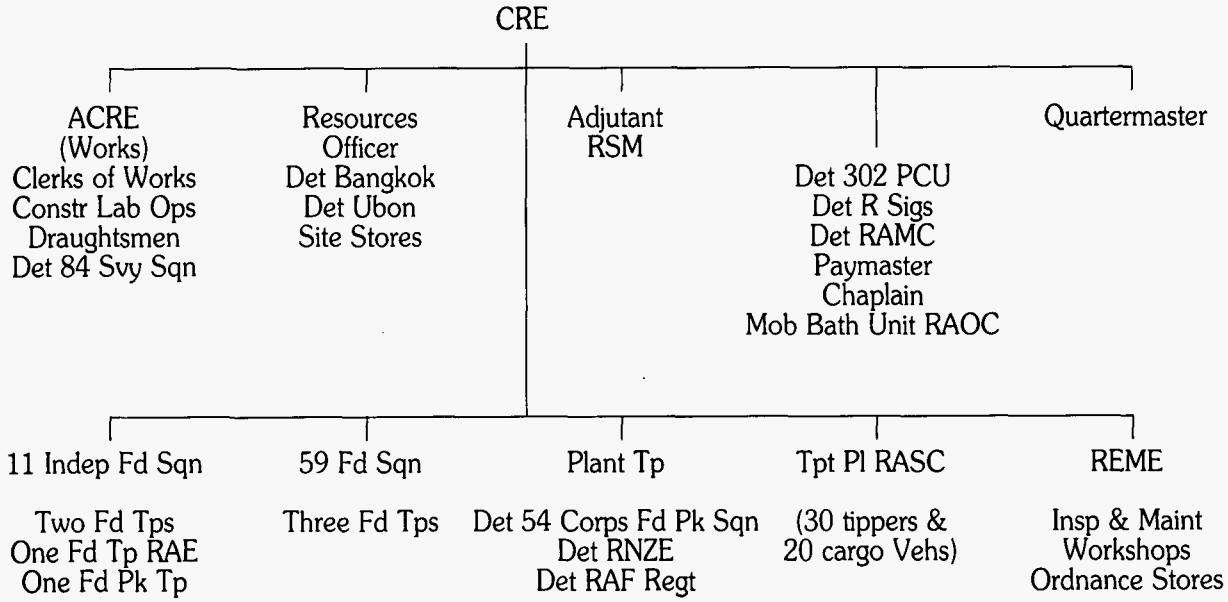


FIGURE 9. ORGANIZATION OF OPERATION CROWN FORCE
(February 1964)



CHAPTER VII

THE ARABIAN PENINSULA AND EAST AFRICA

POLITICAL AND STRATEGIC BACKGROUND - ADEN - Introduction - Deployment Camps - The Radfan - The Dhala Road - The Closing Stages - THE GULF - Background - Redeployment - Airstrips - Well Drilling - Trucial States East Coast Road - Transpeninsular Highway - Other Tasks - Withdrawal - OMAN - Background - Oman - Increasing Rebel Activity - The Dhofar Campaign - KUWAIT - Threat from Iraq - British Response - Engineer Tasks - Handover and Withdrawal - KENYA - RE Organization - Flood Relief - The Training Agreement - Construction Projects.

POLITICAL AND STRATEGIC BACKGROUND

Throughout this period the dominant strategic preoccupation of the West was the need to protect the supply of oil upon which so much of the health of its economy depended. An essential prerequisite was that peace and stability should, as far as possible, prevail in the area, and to this end Britain had for many years maintained treaty obligations with the coastal states of the Arabian peninsula, from Kuwait in the Gulf round to the colony of Aden at the tip of the Red Sea. By 1960, Britain was still committed to providing military assistance, when called upon, to these Arab states to provide protection from external aggression and, in the case of the colony of Aden, retained full military responsibility for its defence. Initially, it was assumed that Aden would continue to form the base for any operation in the area with any necessary reinforcements coming from the established base in Kenya. It had also been planned that by 1962 an amphibious Joint Service Task Force would be stationed permanently East of Suez, capable of putting land forces and heavy equipment, including tanks, ashore in any threatened location.

Over the next ten years, however, most of these plans came to nought. First, increasing political pressure and dissident activity led to premature independence for Aden, without the hoped-for provision of any long term base facilities, and within a few more years any attempt to retain a major presence in the Gulf had also been abandoned. Once again, as in the Far East, this period saw the complete dismantling of what had once been a large British

command, but in those final stages the Sappers, as we shall see, again played their part to the full. The RE deployment in Aden and the Gulf over the years 1963 - 1971 is shown at Figure 10.

ADEN

Introduction

To generations of Britons sailing to and from India and the Far East, Aden was just a hot and sweaty port of call where they might go ashore and stroll through the bazaars whilst their liner or troopship bunkered. It was a small British colony covering only 25 square miles and it enjoyed an economic well being by virtue of the fact that it was the main import-export trading centre of the whole of South Western Arabia, including Yemen. Aden was a polygot port with a highly political labour movement, largely Yemeni in membership and very much under Egyptian influence.

Behind Aden Colony, stretching to about 112,000 square miles, lay the Aden Protectorate, a barren, mountainous and inhospitable land, comprising twenty states with which Britain had treaty agreements to conduct their external affairs and defence in exchange for their enjoying internal autonomy.

The aim of HM Government was to lead the Aden colony to prosperous independence in 1969 in return for the provision of military facilities which Britain would continue to need in the area. To this end a Federation of six states in the Western Aden Protectorate was formed in 1959, later to grow to sixteen in 1964.

Relations between Britain and Egypt had fluctuated between cold and non-existent since the nationalization of the Suez Canal in 1956, and the latter had for long wanted access to the oil of the Arabian States. In 1962 two events occurred which raised her expectations. In September Aden joined the Federation and the next day the ruler of Yemen, who had for many years disputed the South Arabian-Yemeni border, was overthrown and the new Republic sought Egyptian help. President Nasser of Egypt promptly committed 50,000 troops to the area and embarked on a determined effort to make Britain's position in Aden and the Federation quite untenable before agreement over the borders of the Protectorate could be reached with the Government of Saudi Arabia. A major subversive offensive was therefore mounted, involving frequent

ARABIAN PENINSULA SEPTEMBER 1967

MAP 9

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terrorist attacks and civil unrest in the Colony and numerous mine-laying incidents and attacks by Egyptian trained rebels in the Protectorate.

Meanwhile, a ban on overflying Israel and the Arab countries, while unrest prevailed, had effectively split our forces East of Suez from those in the Mediterranean and had considerably reduced the strategic value of Cyprus as the location for their headquarters. Accordingly, in March 1961, HQ Middle East Command was established in Aden.

Deployment Camps

To fulfil the long term intention to retain military forces in Aden after independence, it had already been planned that 24 Infantry Brigade would move up from Kenya and by 1962 the Air Ministry Works Department (AMWD), who were responsible for works services in Aden, were heavily committed to the required "deployment camps".

However, by early 1962, it was already becoming clear that the Command had to be reinforced further and considerably more accommodation was required. AMWD had not the capacity to undertake this additional work and, in April 1962, 513 Specialist Team was sent to Aden to plan the camps, to order the equipment and stores, to complete the site surveys and set up the requisite works organization. By October 1962 the OC of the team (Lieut Colonel E E Peel) had become CRE Deployment Camps, with specially established Works staff, and the STRE returned to England.

A requirement for four extra camps had been identified. Aden Transit Camp was designed to accommodate two battalions in tentage on concrete bases, with kitchens and ablutions in semi-permanent constructions. The living and office accommodation for the permanent staff was in Twynham Huts. The site chosen was north of RAF Khormaksar, just off the Aden-Sheikh Othman road, partly on unstable sand, 400 yards from the sea.

Normandy Camp was situated on the isthmus between Aden and RAF Khormaksar, on level, firm sand, with the water table at six feet. The site was an old reinforcement camp, still partially occupied, which had to be evacuated and removed before the new camp was started. This housed two companies of RASC, one pioneer company and a field survey squadron. Anzio and Salerno Camps, for an infantry battalion and an artillery regiment, were sited in Little Aden, but in early 1963 this

requirement was extended to include a brigade headquarters and a brigade field squadron.

The accommodation module for all the camps was the 64 foot long Twynham Hut. This was a semi-permanent, alloy framed, alluminium clad hut which could be fully air conditioned. It was expensive but provided it was handled with reasonable care could be taken down and re-erected a number of times. From the user's point of view in Aden it was excellent. Camp structures were used for kitchens and latrines while messes and junior ranks clubs were of local semi-permanent construction. Work was executed by a mixed force of Royal Engineers supported by contract labour, where possible, and civilian building contractors.

But before Anzio and Salerno Camps could be built a road had to be constructed through the Thima Pass on behalf of the PWD to join Little Aden with the camp sites. It soon became clear the quantity and spread of engineer work was becoming too extensive for one CRE so in May 1963 CRE MELF was established.

Until 1962, RE support in Aden had been provided by an independent troop in rotation from 38 Engineer Regiment; that year the commitment grew and was filled by 39 Field Squadron. In October 1963 that unit was replaced by 12 Field Squadron and additionally 48 Field Squadron, elements of Regimental HQ and a composite workshop and plant troop were sent out on a six month tour.

Salerno and Anzio Camps were occupied in August 1963 and October 1964, the latter becoming the base for CRE MELF and his units. During 1964, CRE Deployment Camps became CRE Middle East Command which in turn was disbanded in 1965 upon the establishment of a Chief Engineer. In the same year CRE MELF became CRE (Ops) MELF and these two appointments remained until the withdrawal in 1967.

The Radfan

In the face of increased terrorist activity a State of Emergency was declared in the Federation in December 1963 and on 4 January 1964 the area some 50 miles north of the colony, known as the Radfan, was occupied by three battalions of the Federal Regular Army, supported by British troops, including 2 Troop, 12 Field Squadron. This action was code-named Operation Nutcracker and very soon the RE involvement had escalated to include 3 Independent Field Squadron, elements of

9 Independent Parachute Squadron from Bahrain, 12 Field Squadron from Aden and a troop of 34 Field Squadron from Kenya.

The Radfan was divided into the Dhanabah Basin and Wadi Taym districts and it was the provision of the Military Load Class (MLC) 30 route to these from the colony that provided the principal road construction task. The best way to achieve this road link was to follow the alignment of wadi beds, the only feasibly passable terrain to be found. The topography was daunting, with the northerly Wadi Banah (which became known as Pall Mall) having 1,000 feet sheer sides. As a result, during every rain storm, boulders, some weighing as much as 50 tons, were washed onto the alignment. Other local roads in the network were christened Piccadilly, Park Lane, Fleet Street and Ludgate Hill, totalling 17 miles of track which kept two troops and 400 local labourers employed for five months. The incongruity of applying such illustrious names to the rough, dusty tracks which passed for roads in the Radfan seems to have gone unnoticed.

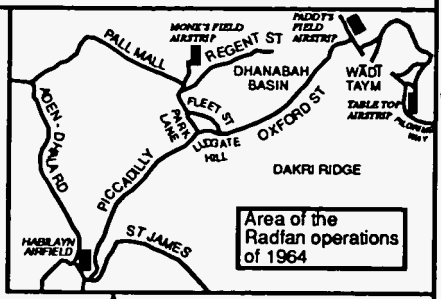
The Dhala Road

A road construction task of quite another order, however, was an alignment of 36 miles from Lahej north to Habilayn, the main up country base and airfield. This road became loosely but universally described as the Dhala road after the Mountain Emirate to which it ultimately led six thousand feet above and some fifteen miles beyond Habilayn.

To impede the operations in the Radfan the rebels carried out indiscriminate mining of the main supply route from Aden and it was considered that the best way of dealing with the problem was to construct a bituminous surface road in which it would be difficult to lay mines in a way that was not easily recognizable. Responsibility for road construction in the Federation lay, of course, with the PWD, but it was impracticable for this organization to complete the whole of this work in the time required. It was therefore agreed that they would continue to surface the road for the next six miles beyond Lahej and the RE would be responsible for the remaining 36 miles. The specification for this section was unsophisticated but adequate for military requirements. It would be gravel paved with a 15 foot wide surface dressed carriageway. The alignment was positioned above the wadi flood level but where wadi crossings could not be

THE RADFAN AND THE DHALA ROAD 1966

MAP 10



YEMEN

DHALA

Khuraybah Pass

Mountain Ranges Spot heights up to 7000 ft

Taym Road

Habilayn Airfield

Wādī Taym

Al Ḥamrā'

Musaymir

AL MILĀH

To TA'IZZ

Mountain ranges

Matlah

Nawbat Dukaym

AL 'ANAD

Line of the foothills Approx 1000 ft Contour

Desert

N

Wādī aş Şaghīr

LAHEJ

0 10 20

MILES

SHAYKH 'UTHMĀN

Military Cantonment

Tawāhī

Crater

Refinery

ADEN

GULF OF ADEN

LITTLE ADEN

avoided it was accepted that culverts and Irish bridges were likely to be washed away.

By March 1965 the foundation work on the southern 14 mile section of MLC 30 was complete, ready for a MEXE high speed road surfacing unit under the control of 9 Independent Parachute Squadron to lay 375 tons of crushed stone per mile. In February 1965 a reinforced 24 Field Squadron deployed in Al Milah to work on the northern section of this road, and two months later 300 Field Squadron of 131 Parachute Engineer Regiment (TA) was deployed to Al Milah for its annual camp. It was particularly tragic that during the tour by these reservists the camp came under attack with the loss of two men killed and five wounded.

Mine clearing was a continual problem, 3 Field Squadron sustaining 16 casualties from nuisance mining. It became clear that the rebels were laying British Mk 5 and Mk 7 mines at track junctions and bottlenecks and usually on the outside of a bend. These mines were creating craters three or four feet deep which suggested initially that they were being laid at depths greater than those at which the detector remained sensitive. However the enemy tactics were disclosed when a Mk 7 mine was unearthed with a one pound slab of gun cotton beneath it.

The detection of mines was a considerable challenge; detectors gave an almost constant signal due to the volcanic nature of the ground which itself was so hard that prodders could not penetrate. At best, the roads were closed for the first two hours of each day whilst foot patrols inspected the surface for disturbance. One successful technique for detecting any such disturbance on unsurfaced roads was to spray the top with oil. However the quantities required were large and there was a danger of contaminating any water supply so the method was seldom used.

73, 48 and 30 Field Squadrons all played major parts in the road building programme, including an extension from Habilayn to Wadi Taym, despite sporadic attacks by the rebels. Other work in the Radfan included the construction of four airstrips and the provision of water, electricity, cold storage, showers and concrete tent bases for a mixed Army/RAF camp at Habilayn, all the tents of which had to be protected by sangars or sandbag walls from rebel fusilades which occurred almost nightly. The construction of similar helicopter sangars was also a major task.

Among the "hearts and minds" tasks undertaken in the Radfan water supply was of prime importance. 521 STRE (Well Drilling) successfully completed eight wells during a nine month tour during 1964 and 1965 and on their departure a well drilling troop was formed as part of 63 Park Squadron. The existing local wells were up to 100 feet deep, stone lined, and 8 - 10 feet wide, whereas those drilled by the Royal Engineers were tube wells of 200 - 400 feet depth, yielding an average 1000 gallons per hour.

Small groups of Sappers on lengthy detachments carried out work at Mukayras and Bayhan despite increasing danger and the ultimate untrustworthiness of the Federal Regular Army who provided their protection. A major airfield task was undertaken by 10 Airfield Squadron at Bayhan to enable it to be used by Hunter fighter-ground attack aircraft. Increasing dissident activity also led to the withdrawal of many MPBW expatriate staff and their places were taken by Garrison Engineers, Clerks of Works and tradesmen from the Royal Engineers.

In February 1966 the Labour Administration announced that it no longer proposed to maintain defence facilities in Southern Arabia after granting independence in 1968. It was hoped that with this decision the attacks against the British would stop but in fact the reverse occurred as the rivals, the Front for the Liberation of Occupied South Yemen (FLOSY), and the National Liberation Front (NLF) were spurred on to increase their attacks in an attempt to prove that each was the stronger and rightful heir to the Federation.

The politico-military situation was in truth already beyond redemption but the British Government still felt that its objective could be achieved by a continued hearts and minds campaign, in which the Royal Engineers would play the single most important role, by opening up land communications and well drilling. But having failed to develop the protectorate in any material manner for the past hundred years this belated goodwill was simply represented by the rebels as a shallow ploy. Furthermore, the tribesmen who made their living transporting goods by camel did not welcome their livelihood being stolen by the truck drivers of Aden and they were therefore understandably sympathetic to the rebels.

Despite increasing terrorism the building of the Lahej-Habilayn and Habilayn-Wadi Taym road was completed. Black-topping greatly reduced the incidence of mining but there were

continual attacks on men and plant and sporadic mining and damage to culverts. During remarkable storms in early 1967 involving unusual floods the tarmac road stood up very well; it was only in the Wadi Matlah that the road was washed away where it crossed the wadi bed, as had been foreseen.

Throughout nearly four years of this work the Aden based units were supplemented by squadrons in rotation from the UK and BAOR. All did magnificent work and their low rate of casualties reflected their good discipline and tactical training. In an extreme example, a construction party from 39 Field Squadron from BAOR, moving tactically in the Wadi Matlah on 30 May 1967 encountered a major ambush. Two sappers were killed and one officer and eight sappers wounded but they acquitted themselves well. The officer, Lieutenant M J Conroy, though pinned down by fire, quickly regained control, called in air support and a successful action against the ambush position ensued. For his part in this action Lieutenant Conroy was subsequently awarded the MC.

In the meantime RE support to the Aden Brigade continued as did support to the Royal Air Force by 10 Field Squadron (Airfields) who sent detachments to bases in Malagasy and Zambia and to Raisut, Salalah and Masirah in the Oman. 523 STRE, formed in early 1966, continued to operate as a Military Agency Works Area up country in place of the MPBW.

The Closing Stages

Meanwhile, in Aden itself, the situation had been steadily deteriorating. Bombing and shooting had continued, the Governor himself having been wounded in 1963 and the Superintendent of Police being killed in 1965. That year direct rule by the Governor was imposed, but by 1967 it had become only too clear to the Government that there was no hope of achieving a peaceful transition to independence in 1968. In April the combined effects of a general strike, in protest at the arrival in Aden of a three man UN Mission, and an unusually severe rainstorm resulting in a flood, put a large part of the public utilities out of action. The Sappers played a major part in restoring them, working often in disgusting conditions, cheered on by the occasional grenade.

The turmoil came to a head on 20 June when the South Arabian Army (as the old Federal Army had become) mutinied, the police opened fire on British soldiers outside the town and

an infantry company was ambushed in Crater, a district of Aden. Plans were laid to bring forward the date of independence and, in the meantime, to close all units in on the town and to organize an orderly withdrawal. Despite this intention engineer hearts and minds tasks continued but in an atmosphere of mounting frustration as contrary political decisions emerged almost daily. The CRE Ops kept two lists on the back of his millboard headed "Odd Days" and "Even Days" whereon he wrote, in less than three months, seventeen matters which were the subject of successive contrary orders.

By the end of June troops had been finally withdrawn from the Radfan. Action then centred in and around Aden itself with 60 Field Squadron, and later a troop of 50 Field Squadron, supporting the Aden Brigade. The excellence of their support is testified by the number of battalion commanders who put Sappers up for awards. A quaint and symbolic task was the removal of Queen Victoria's statue from its time-honoured position in the Crescent to the purlieu of the new British Embassy.

Throughout the emergency something like a third of all Sappers in the Middle East were deployed on tasks for MPBW, including all work outside Aden itself. As the situation inside Aden deteriorated the Royal Engineers became increasingly involved and the first instance of a Military Works Area being set up occurred on 15 October 1967. This operation was entirely successful. A few specialists of MPBW remained running the power station at Khormaksar and co-operation was excellent in all phases.

These activities in Aden were taking place at the same time as the closing down of the theatre, the despatch of stores and equipment to the UK and to the Gulf, and the reorganization and redeployment of units to the Gulf. CRE Ops MELF moved to Bahrain in September 1967 to become CRE Gulf, 10 (Gulf) Field Squadron and 63 (Gulf) Support Squadron were established in Sharjah, with a field troop of 10 Squadron detached to Bahrain.

Whatever views may be held about the degree of honour with which this country departed from South Arabia, there can be no two views about the honour with which the armed services emerged and there is no doubt that the Corps earned a memorable share of it. Among the last to leave was the Well Drilling Team from MELF Park Squadron who left behind twelve

wells totalling 3,273 feet in depth. The Clerk of Works who were dispersed throughout the country building barracks for the Federal Army were the last of all to leave and for some time they had no British protection whatsoever. It says much for the goodwill they had generated by their many activities apart from building, such as acting as trades trainers, school teachers, doctors and even midwives, that they were generally immune from attack. Some were threatened and had to be hastily withdrawn but all showed immense courage in their frequently tense isolation.

The Chief Engineer left Aden in September 1967 and was succeeded by a CRE until the final departure on 20 November. During the evacuation phase a troop of 59 Field Squadron from FARELF lay off Aden in a carrier with 42 Commando and took some part in operations ashore.

THE GULF

Background

When Land Forces Persian Gulf (LFPG) was established in 1959 it was defined as having responsibility for Kuwait, Trucial Oman (later to become the United Arab Emirates (UAE)) and the Sultanate of Muscat and Oman.

Britain had had an interest in the Gulf since the early seventeenth century; indeed, the first treaty with Oman was signed in 1798 declaring the French and Dutch as enemies of Oman as well as of Britain. The seven sheikhdoms of the Trucial States, of which Abu Dhabi, Dubai and Sharjah were the most important, were under British protection, as were Bahrain and Qatar. Their rulers were helped and advised by a British Resident in Bahrain and political agents elsewhere. A small native military-cum-gendarmarie force, the Trucial Oman Scouts (TOS), was based at Sharjah and since 1921 it had been agreed that Britain would help to raise and train the Sultan's Armed Forces (SAF) in Muscat and Oman.

Redeployment

In 1966, with the impending withdrawal from Aden, it was foreseen that additional forces would have to be deployed to the Gulf. It was not practical for MPBW to complete all the accommodation within the time available by normal contractural methods so the Corps was requested to provide support in the

construction of camps in Bahrain and elsewhere. In May a field troop of 20 Field Squadron was sent to Bahrain to prepare accommodation for the main construction force and in September elements of RHQ 36 Engineer Regiment, 24 Field Squadron, 61 Park Squadron and 524 STRE arrived from UK. The work was completed by the end of May 1967.

In September 1967 as mentioned earlier, CRE (Ops) MELF, 10 Field Squadron (Airfields) and 63 MELF Park Squadron moved into the area from Aden, and for the troops concerned the change in political atmosphere on moving north was striking. In Aden, towards the end, every Arab had been viewed with suspicion, but throughout the Gulf the welcome was genuine. With the discovery of oil the chief towns were about to mushroom into a spreading growth of concrete, but in the hinterland life remained much as it was in Biblical times, except that the badge of manhood was to carry a rifle rather than a sling. Travel was by foot or camel, motor vehicles had never been seen in many villages and the appearance of an army lorry was to the native a heaven sent opportunity for a lift. It was a common sight to see a landrover on arrival at a troop camp site disgorging an entire posse of white clad Arabs.

Since its inception HQ LFPG in Bahrain had been a minor out-post of the Middle East Land Forces, but it now suddenly became the hub of the British defence commitment in the area. Sharjah was the main military base with a considerably increased air element of both the RAF and Army Air Corps. Air transport was still the key to quick movement as, except for a few miles of concrete highway between Sharjah and Dubai, roads were virtually non-existent.

All engineer construction tasks were the formal responsibility of the Ministry of Public Buildings and Works but the Regional Director MPBW and the CRE quickly agreed that the former would direct construction work on the permanent bases while the latter would be responsible for all "up country" tasks.

Airstrips

Among the tasks to be done in the interior was the maintenance, improvement or construction of airstrips and helipads throughout the area. The workhorse of air transport support had been the Beverley aircraft, ponderous and thirsty but with a large cargo hold well suited to the carriage of engineer equipment.

Shortly to be withdrawn from service it was essential to use the Beverley for moving plant to certain airstrips which needed extending to take the replacement Argosy and Andover aircraft.

The natural surfaces of the up-country airstrips had hard but thin surfaces which were soon broken down if an aircraft landed too heavily, as was proved to the CRE (Lieut Colonel W J Reed) on his initial airstrip reconnaissance. The RAF Twin Pioneer in which his party were travelling taxied into the wheel-ruts of a recently departed Beverley, the wheels sank and his aircraft tipped slowly onto its nose. The two youngest members of the party, the sapper troop commander and the co-pilot, walked seven miles to the nearest TOS camp at Masafi to seek help both for the abandoned party and for themselves, by then in a state of near exhaustion from the heat.

Well Drilling

Hitherto most of the engineer tasks had been undertaken on behalf of the MPBW. Now, when opportunity arose, work was also done for the Trucial States Development Council (TSDC). Well drilling and water supply were of prime importance in this inhospitable corner of the globe; and it was this aspect of the work performed by Gulf Engineers that went further in winning "hearts and minds" than any other, as the local inhabitants were immediately aware of the benefits of having their own water supply and irrigation systems. The Water Production Troop of the Gulf Support Squadron drilled eleven wells between 104 and 300 feet deep. Two of these wells were dry and one saline, whereas the other eight produced outputs varying from 500 to 2100 gallons per hour. The troop was often working in temperatures in excess of 130°F, (when metal is too hot to touch with bare skin), in remote locations spread throughout the Gulf.[1]

Trucial States East Coast Road

In 1968 10 Gulf Squadron with plant and explosives opened up 40 miles of road from Diba to Khor Al Fakhan for 3 ton traffic. Successive Field Squadrons (73 and 53) worked to improve the route. The Gulf Engineers blasted through the rock cliffs and roughly shaped the formation which the Trucial States Development Council (TSDC) graded and surfaced whilst facing the embankments and side hillcuts to prevent sea erosion. The

opening of this road enabled the development of the East Coast of the Trucial States to proceed at a much increased rate.

Transpeninsular Highway

Across the Trucial States the TSDC planned a black topped 24 foot carriage-way from Sharjah to Fujayrah. The initial 50 miles from Sharjah to Dayd had already been completed by civilian contract but the original route through the jebels was in the bottom of Wadis Siji and Ham. Each year this route was washed out by flash floods during the rains so the Gulf Engineers and the TSDC selected an alternative route above the 20 foot flood level. The new route involved a 30 foot deep cutting through a rock saddle, several thousand yards of side-hill cut in the jebel rock face, the erection of four Callender-Hamilton bridges and at least ten miles of road re-alignment. Between October 1969 and the end of 1970, 32 and 53 Squadrons cut and shaped the roads to rough formation and constructed the culverts and bridges while the TSDC prepared masonry abutments for the bridges, faced the embankments with stone and black topped the road. The completed highway now gave high speed road communications between the East and West coasts of the Trucial States.

Other tasks

Many of the tasks undertaken by the Gulf Engineers were less than troop size projects, assisted by local civilians and the resident militia. An example was the Agency Build. In order that the TOS could become self-supporting on the withdrawal of HQ LFPG, a number of buildings had to be erected in Al Murqaab camp to hold the Scouts' required maintenance backing of stores. Cost limitations prevented the use of MPBW for this task and Gulf Engineers were directed to design and build the required installations, for which £19,000 was allotted to cover the cost of materials. The task consisted of erecting two 120 feet long Twynhams, one 32 foot Twynham, one Marston shed and a 60 foot by 20 foot concrete construction ammunition store with asbestos sheet roof and two 10 feet high sand filled concrete block traverses each 10 feet wide. A vehicle park with a 12 feet high chain link fence was later added to the project. The work was started by 73 Gulf Field Squadron in May 1969 and it was satisfactorily completed by 32 Gulf Field Squadron in May 1970.

With the fuel strike that paralysed Aden fresh in the mind, plans were made in 1969 for an emergency fuel supply installation at HMS *Jufair* in Bahrain. The Royal Engineers installed a pillow tank with walls and shade cover together with pipeline and pumping station to receive fuel from dracones, rubberised sausage shaped fuel containers, which could be filled from tankers at sea and be towed by tugs inshore to discharge. Emergency generators were also installed but, in the event, the British were to depart shortly from Bahrain without hostility and none of the emergency installations were used.

Constant local crises made engineer planning notably imprecise and demanded much flexibility. It was surprising how much construction work was actually accomplished in less than four years before final withdrawal. Shipping timetables were valueless; if a port was crowded ships would divert to Bombay or Basra, for example, and return weeks later. The franchise for importing cement into Bahrain was restricted to one relative of the Ruler and when he fell ill no shipments arrived. A crisis ensued for cement had been received and issued through the same doors and as the stores were emptied so it was discovered that the bags got harder and harder - without a proper system of turnover, hundreds of tons had gone off in the humid atmosphere.

Most travel was by air, either by RAF or Gulf Air, the local civil airline. As a major shareholder in the latter, should a Ruler wish to fly around the Gulf an aircraft would be taken out of scheduled service and the booked passengers expected to fly the following day. Such frustrations were common and quite expected in a region which was a fascinating mixture of the mediaeval and modern.

Withdrawal

Within a year of the establishment of Land Forces Persian Gulf as successors to MELF the Government was turning its thoughts to an early withdrawal. The Foreign Secretary toured the Gulf States in early 1968 to assess their rulers' reactions which were that, if the British could not pay for their forces to stay, they themselves would be very willing to cover the cost. When in the subsequent parliamentary debate the early withdrawal was announced, the Secretary of State for Defence, Rt Hon Denis Healey PC MP, was asked why the Government was not prepared to accept the rulers' offers. His reply was unfortunate.

"We are not" he said "prepared to act as white slavers to the Arab sheikhs". This remark might well have passed unnoticed in the Gulf but for the BBC World Service who relayed the statement from their transmitters on Masirah Island, off the coast of Oman, which was the local source of English language broadcasts. The British residing in Bahrain were appalled and embarrassed. The Political Resident sought and obtained an immediate telegram of apology from London and some nimble diplomacy by the Political Agent in Bahrain, Anthony Parsons, (later Sir Anthony Parsons, United Kingdom Ambassador to the United Nations for 1979 - 1982) stopped the offending phrase being published in the Gulf Times.[2]

In 1970 the withdrawal from Sharjah and Bahrain began with the departure of the CRE and the field squadron at Sharjah in November, leaving a troop in Bahrain for the final run-down. Equipment was disposed of by local sale and encampments were handed over to the local forces. HQ RE closed in May 1971. The Gulf Support Squadron departed in August and the final withdrawal took place in January 1972, leaving Royal Engineer detachments only in the Oman where rebel activity in the Dhofar had swelled into a serious conflict.

OMAN

Background

The Eastern coastal area of the Arabian peninsula bordering on the Indian Ocean contained the state known in 1960 as Muscat and Oman. In reality this Sultanate was in two halves, a Northern province Oman based on the capital Muscat, which included sovereignty of the northernmost tip controlling the Strait of Hormuz, and the province of Dhofar in the South bordering directly onto the Aden Protectorate. The two components were separated by a thousand kilometres of trackless desert waste.

Oman

It was only in 1959 that the Sultan's rule was firmly established over the mountainous central region of Oman when, with British assistance, the rebellious tribes of the Jebel Akhdar loyal to the old Imam were brought to heel[3]. Oil was by then being piped from Fahud in the western Oman to the coast near Muscat and political stability had to be ensured. In return for the continued and increased provision of loan service personnel, including a

number of Sappers, to the Sultan's Armed Forces it was agreed that the RAF would operate the airfields at Salalah and Masirah, both of which were required by Britain as staging posts between Aden and the Gulf. Much work was subsequently done at Masirah by the Gulf Squadrons, including the installation of Rotary Hydraulic Arrester Gear and the extension of the runway so that it could be used in emergency by VC10, Victor, Phantom, Hunter and Belfast aircraft.

Typical of the other Corps tasks at this time was the construction of a route in 1969 by a troop from 73 Gulf Squadron - who had replaced 10 Gulf Squadron at Sharjah for a nine month unaccompanied tour - through the Wadi Sahtan. A fertile bowl in the highlands contained seven villages which between them grew much more produce than could easily be moved to the ready market at Rustaq down the only existing camel track. Despite the presence of dissident tribesmen and daytime temperatures up to 130°F, the troop built a three-tonner route through the Wadi between 12 May and 21 June.

Increasing Rebel Activity

The British withdrawal from Aden and the establishment of the Peoples Democratic Republic of Yemen (PDRY) which was receiving increasing support from Russia and, to a lesser extent, China, heightened the tensions in the South. Indeed, a dissident Dhofar Liberation Front had been active spasmodically from about 1962, and this was receiving increasing help from sympathizers over the border in what was then the Protectorate. As the volume of crude oil sales from the Fahud wells increased so did the wealth of the country, but there were many who felt that their ruler Sultan Said was not making use of it to improve the social infrastructure, schools and hospitals and thereby failing to bring their country up to Western standards with adequate speed. In April 1970 the RAF station at Salalah came under fire from rebels and the remaining MPBW civilians and tradesmen left shortly thereafter. Four members of the Military Engineering Services training element, which had been formed for this very purpose, were immediately deployed to fill the supervisory posts and NCOs and tradesmen from 32 and 15 Squadrons were flown in to support them. In the face of the growing unrest in June 1970, with undoubted encouragement from Britain, the Sultan was replaced in a coup by his son

Qaboos. In the same year the Sultanate became known by the single title Oman.

The new Sultan recognized the need to build up his armed forces rapidly particularly in the south if his country was to retain its independence. He received additional support in kind from units of neighbouring states including Jordan, Iran, India and Pakistan. The chief concern of the British government was to help prevent communist control in the west spreading through Oman from Yemen, through Dhofar to Muscat and the Straits of Hormuz and thence give access to the Gulf. Equally the government was concerned to avoid any accusations that it was perpetuating its colonial activities in the theatre. Initially, therefore, engineer assistance was restricted to a large number of minor construction tasks, many of a hearts and minds nature. Works support continued in Salalah itself, from January 1971, with a detachment from 15 (Gulf) Support Squadron.

Because of continued rebel activity the DOE expatriate staff did not return and Salalah remained a military agency works area for some years. The small staff was reinforced by one officer and two NCOs in June 1971 and a troop of 60 Field Squadron was deployed from UK from October to December 1971 on a variety of tasks in Salalah town, including the erection of a 25,000 gallon Braithwaite water tank and improvements to the sewage system. They were followed by a troop of 52 Field Squadron (Airfields) who were deployed for five months in March 1972 to carry out further emergency work on behalf of DOE. Over the same period, 521 STRE (Well Drilling), with eight building tradesmen under command, drilled eleven wells and built a dispensary and schoolhouse at Taquh to the point at which the local authorities could complete the task unaided.

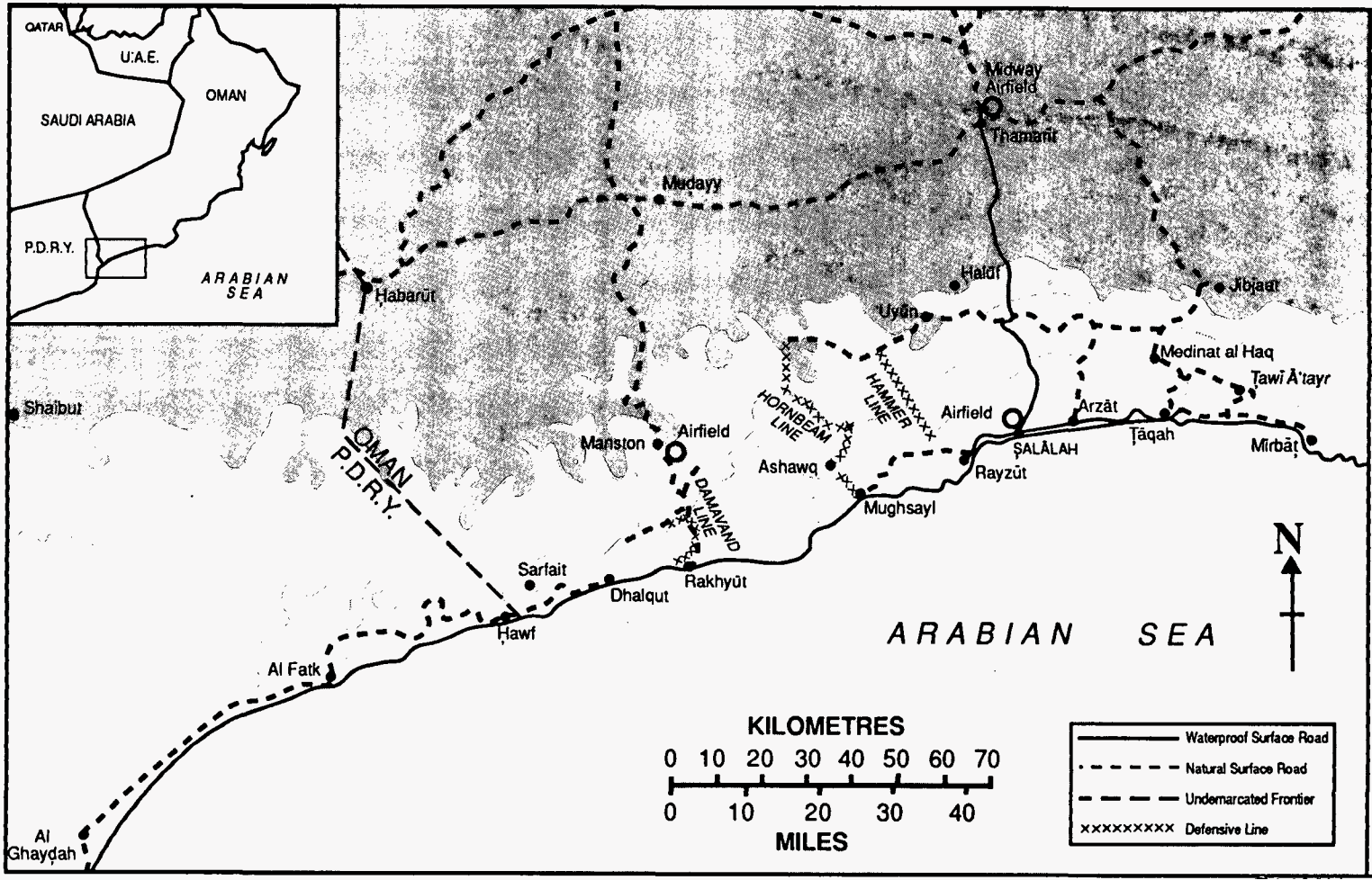
The Dhofar Campaign

Meanwhile, the People's Front for the Liberation of the Arabian Gulf (PFLOAG) based in the Yemen had aspirations, in the immediate term, to turn Oman communist. In order to prevent this, the Sultan deployed the Dhofar Brigade with the aim of securing the province for peaceful civil development. In the initial stages this was done mainly by holding extensive defensive lines to prevent large scale enemy movements and resupply, and mounting set piece attacks whenever the enemy presented a worthwhile target. The Brigade, which included Omani and Baluch battalions, was part of the Sultan's Armed

Forces with key officers being mainly British, either on secondment or contract, some of whom were Royal Engineers. Besides infantry, there was an armoured car squadron, field artillery and substantial air support. British troops included an SAS squadron deployed as a British Army Training Team (BATT) and a reduced Royal Engineers field squadron of 75 all ranks, consisting of squadron headquarters, a support troop and a field troop. Other engineers, such as Royal Jordanian Engineer platoons, Sultan's Force Engineer (SFE) troops and, on one occasion, Iranians were under the operational command of the Squadron Commander. The remainder of the Field Squadron was typically deployed with a strong troop (45) in Belize, a further field troop at home or overseas and the Squadron Rear HQ under command of the Squadron Quartermaster in one of the UKLF Engineer Regiments.

Under a directive issued by DMO, the squadron could not be deployed in direct support of ground operations nor was any member to go to Sarfait, the forward Brigade position overlooking PDRY. Within these limitations the squadrons rotating from England carried out some combat engineer tasks but operated chiefly on hearts and minds projects as part of the overall operational policy of reducing the vulnerability of an inherently scattered population by resettling them into secure collective areas.

Typically, a detachment of ten tradesmen from 38 Engineer Regiment carried out the construction of Twynham Huts between 1 December 1972 and 14 January 1973. 2 Troop of 50 Field Squadron was deployed in March 1973 on a four month tour and its tasks included improvements to field defences, route maintenance, assistance to local school projects and provision of combat engineer advice. Further community development tasks and some military defence tasks were undertaken successively by 50 Field Squadron, 51 Field Squadron (Airfields) and 48 Field Squadron. 60 Field Squadron had a particularly interesting tour from September 1974 to January 1975 during which time the Dhofar Brigade gained the upper hand and the war was effectively won. Their work included road, track and airstrip construction, installation of permanent water supply and distribution systems for consumption by men, camels, cattle and goats, the building of food stores, schools, clinics and accommodation and the completion of many combat engineer tasks.



SOUTHERN DHOFAR 1976

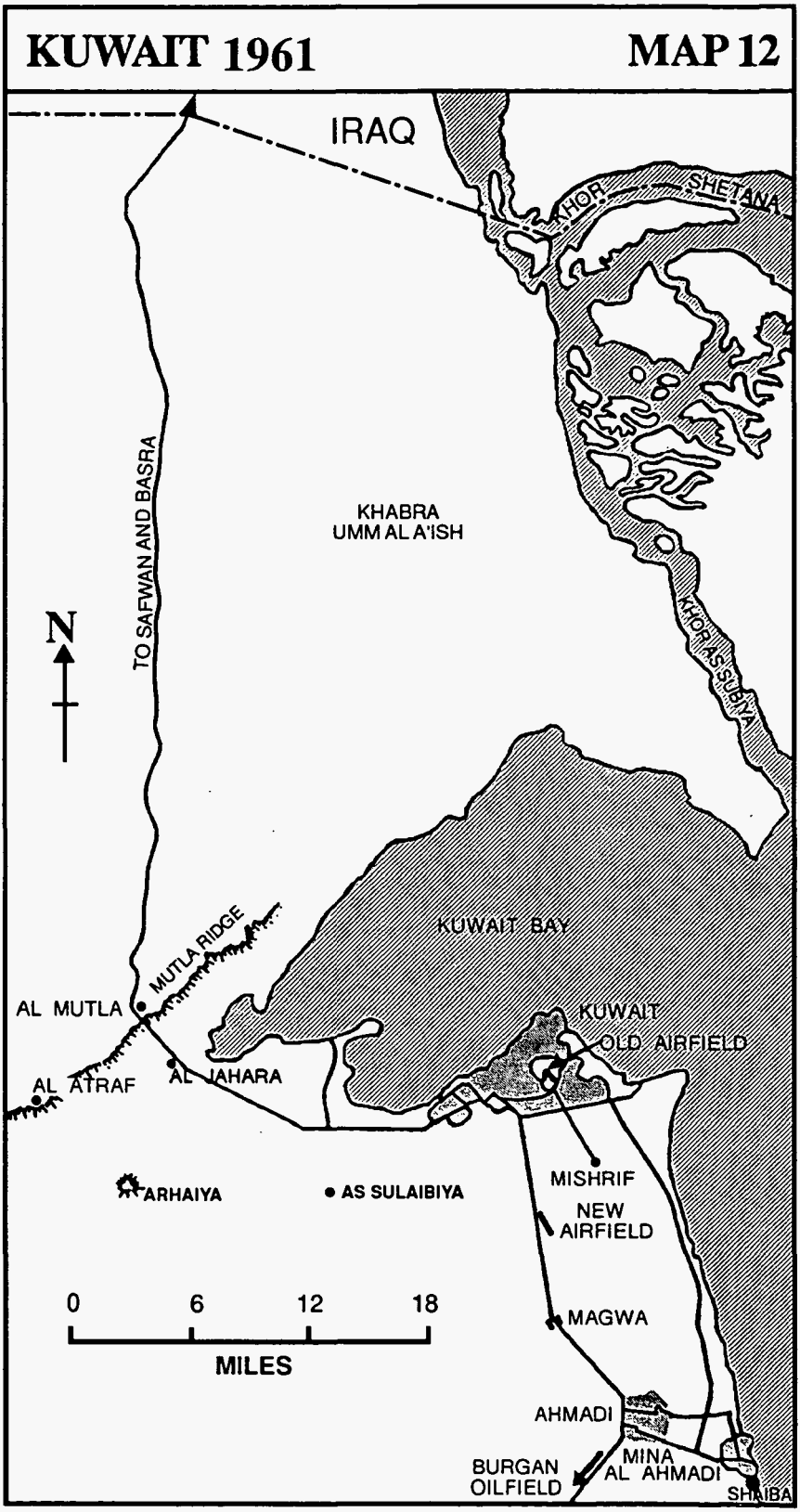
MAP 11

A curious local phenomenon was a four month monsoon period from June to September, during which time dense cloud and fog descended on the coastal strip and the jebel behind. As a result all travel by air and much over land was affected, severely restricting operations, while at sea beach landings were virtually impossible because of the heavy surf. Field squadrons from the United Kingdom therefore normally completed two four month tours during the good season with maintenance parties being deployed during the monsoon. Between 1973 and 1977 the following units from UK took part:

October 1973	50 Field Squadron
February 1974	48 Field Squadron
October 1974	60 Field Squadron
February 1975	Detachment 53 Field Squadron (Airfields)
June 1975	Maintenance Party 39 Engineer Regiment (Airfields)
September 1975	20 Field Squadron
January 1976	32 Field Squadron
August 1976	Detachment 15 HQ Squadron
October 1976	50 Field Squadron
February 1977	11 Field Squadron
August 1977	Detachment 11 Field Squadron
October 1977	Detachment 3 Field Squadron

All squadrons found these tours most rewarding. Sections were usually deployed independently, often with extra local labour, and most sappers had plenty of opportunity to practise their skills operationally. Tracks were cleared of mines, forward helipads laid during operations and assistance given with defensive positions. In the early stages, before locations were secure and tracks built, nearly all resupply of engineer stores, in addition to combat supplies, was by air.

Two major tasks were the construction of the Mudhai to Manston road and the construction of wire and obstacles on the Hornbeam line. This was the largest operational obstacle built by the Corps since Korea and stretched inland for 30 miles over rugged country from Mugshayl on the coast to the edge of the desert. The Royal Jordanian Engineer company built the northern half, while the Royal Engineers (mainly 48 Field


KUWAIT 1961
MAP 12
IRAQ
KHOR SHETANA
TO SAFWAN AND BASRA
KHABRA
UMM AL A'ISH
KHOR AS SUBIYA
N
KUWAIT BAY
MUTLA RIDGE
AL MUTLA
AL ATRAF
AL JAHARA
KUWAIT
OLD AIRFIELD
ARHAIYA
AS SULAIBIYA
MISHRIF
NEW
AIRFIELD
0
6
12
18
MILES
MAGWA
AHMADI
BURGAN
OILFIELD
MINA
AL AHMADI
SHAIBA

Squadron) built the southern end. It consisted of triple concertina wire, heavily sewn with anti-personnel mines and was most effective in preventing enemy supply trains from travelling East.

By 1977 the Sultan's Armed Forces with air and ground force support provided by the Shah of Iran, had succeeded in driving the insurgent forces back into PDRY and had established full control at Dhofar province. The engineer contribution to the winning of the Dhofar War was thus considerable. So ended for the time being Royal Engineer involvement in the Arabian world. However before we leave this geographic area and move south to events in Kenya, mention must be made of a highly successful operation which took place much earlier at the northern extremity of the Gulf. This was the Kuwait operation of the summer of 1961, the outcome of which as we shall see was much dependent upon the ready availability of our troops in East Africa.

KUWAIT

Threat from Iraq

On 21 June 1961 the United Kingdom and Kuwait announced an Exchange of Notes which cancelled the existing Anglo-Kuwaiti Agreement of 1899 and gave formal expression to Kuwait's independent sovereign status. The Notes also reaffirmed the United Kingdom's readiness to come to the assistance of Kuwait should its government so request. On 22 June Kuwait applied to join the Arab League. However on 25 June General Kassim, the Iraqi Prime Minister, publicly announced that Kuwait was an integral part of Iraq, that the Anglo-Kuwaiti Agreement above had been illegal and that he rejected the new Agreement contained in the Exchange of Notes between the United Kingdom and Kuwait of 21 June. On 26 June the Kuwait Government countered by announcing that the country was now an independent Arab State and would defend its territory. On 30 June, following reports of Iraqi troop movements to the south of Basra, the Ruler of Kuwait - His Highness Sheikh Sir Abdullah al Salim al Sabah - formally requested British assistance under the terms of the recent Exchange of Notes.

British Response

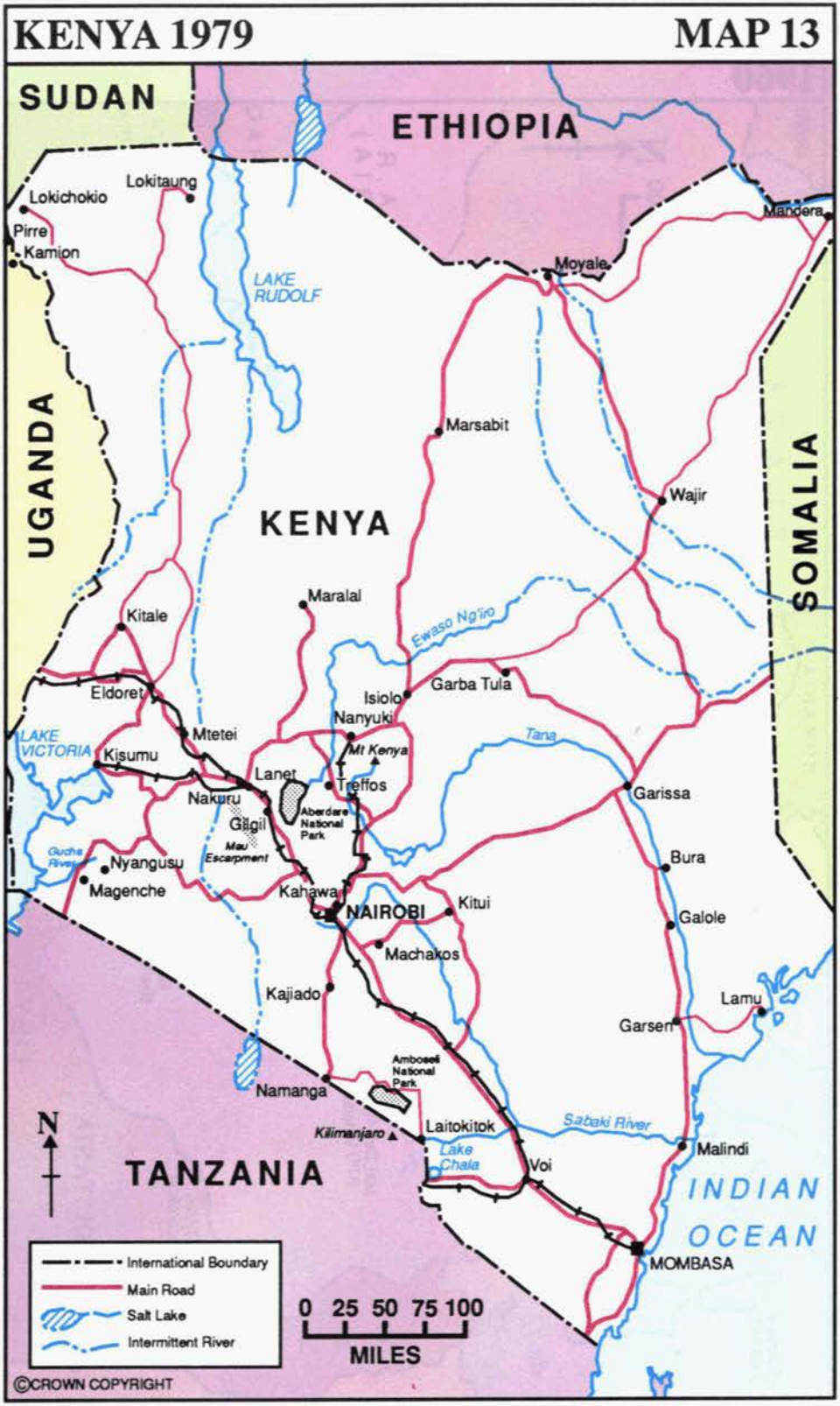
On 1 July, 42 Royal Marine Commando landed by helicopter from the carrier HMS *Bulwark* which fortunately happened to be within striking range. 2nd Battalion The Parachute Regiment with 1 Troop of 9 Parachute Squadron arrived by air and deployed behind the Mutla Ridge near Al Jahara. Centurion tanks of 3rd Dragoon Guards, also then afloat in the Gulf, landed from their LST and a detachment of 1st Battalion the Coldstream Guards flew in from Bahrain. Units of the Kuwaiti Army were also operationally deployed.

Meanwhile one of the functions of 24 Infantry Brigade in Kenya was to reinforce the Arabian Peninsula and Persian Gulf areas if needed. Indeed the brigade had rehearsed such a deployment to Sharjah earlier in the year. Urgent plans were therefore now put into operation to airlift the bulk of the brigade to Kuwait.

Intelligence available in East Africa for Operation Vantage, as the reinforcement of Kuwait was known, was minimal and strictly on a "need to know" basis; no maps were available, no prior reconnaissance by unit commanders on the ground was possible and, for example, the OC 34 Field Squadron (Major F W E Fursdon) had no access to any relevant engineer intelligence regarding either the terrain or the engineer resources available.

On 29 June 1961 he and a small team were in the Karamoja District of North East Uganda with 4th Battalion The King's African Rifles, undertaking a final reconnaissance of a new mountainside security track in the Pirre/Kamion area. The task was to be undertaken by 3 Field Troop due to arrive in the area that evening, having travelled the 350 miles up from Gilgil; but they never got there. At 2000 hours the OC received a signal that he had to be back in Gilgil by midday the next day and the radio that night confirmed the "flap" as Kuwait. Abandoning his team and hitching a ride back to Gilgil on a fortuitiously passing Kenya Police Cessna soon after dawn, the OC fortunately spotted the 3 Troop convoy from the air, seven miles short of their destination where it had been stranded by flash floods, and managed to order it by radio to return to base forthwith.

Back in squadron headquarters the main difficulty was, as successive signals from brigade HQ overtook each other in shortening the notice to move, that no-one could say whether the operation about to be embarked upon was Vantage or not.


KENYA 1979
MAP 13
SUDAN
ETHIOPIA
UGANDA
SOMALIA
TANZANIA
KENYA
Lokichokio
Lokitaung
Pirre
Kamion
Moyale
Mandera
LAKE RUDOLF
Marsabit
Wajir
Maralal
Kitale
Ewaso Ng'iro
Eldoret
Isiolo
Garba Tula
Nanyuki
Mtetei
LAKE VICTORIA
Kisumu
Mt Kenya
Tana
Lanet
Treffos
Nakuru
Garissa
Gilgil
Aberdare National Park
Mau Escarpment
Gucha River
Nyangusu
Bura
Magenche
Kahawa
NAIROBI
Kitui
Galole
Machakos
Kajiado
Lamu
Garsen
Amboseli National Park
Namanga
Kilimanjaro
Laitokitok
Sabaki River
Malindi
Lake Chala
Voi
INDIAN OCEAN
MOMBASA
N
International Boundary
Main Road
Salt Lake
Intermittent River
0 25 50 75 100
MILES
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EASTERN MEDITERRANEAN 1960

MAP 14

Crown airfield, Thailand

Beef Island airfield under construction by 53 Field Squadron (Airfields).
(Courtesy Soldier Magazine)

Crown airfield, Thailand & Beef Island airfield under construction

Cliff face blasting preparations in South Arabia. *(Courtesy Imperial War Museum)*

Park Lane, Radfan under construction by 3 Independent Field Squadron 1964

Cliff Face South Arabia & 3 Indep Fd Sqn

521 Specialist Team well drilling
at Thumier 1964

Mine detection in Dhofar 1977.
(Courtesy Soldier Magazine)

521 Specialist Team well drilling at Thumier 1964 & Mine detection in Dhofar 1977.

Akrotiri Mole, Cyprus, nearing completion in 1966. *(Courtesy TICRE)*

Work on Laboratory Wharf, Valletta in 1974, supervised by STRE (Malta).
(Courtesy Soldier Magazine)

Akrotiri Mole, Cyprus, nearing completion in 1966. (Courtesy TICRE)
& Work on Laboratory Wharf, Valletta in 1974.

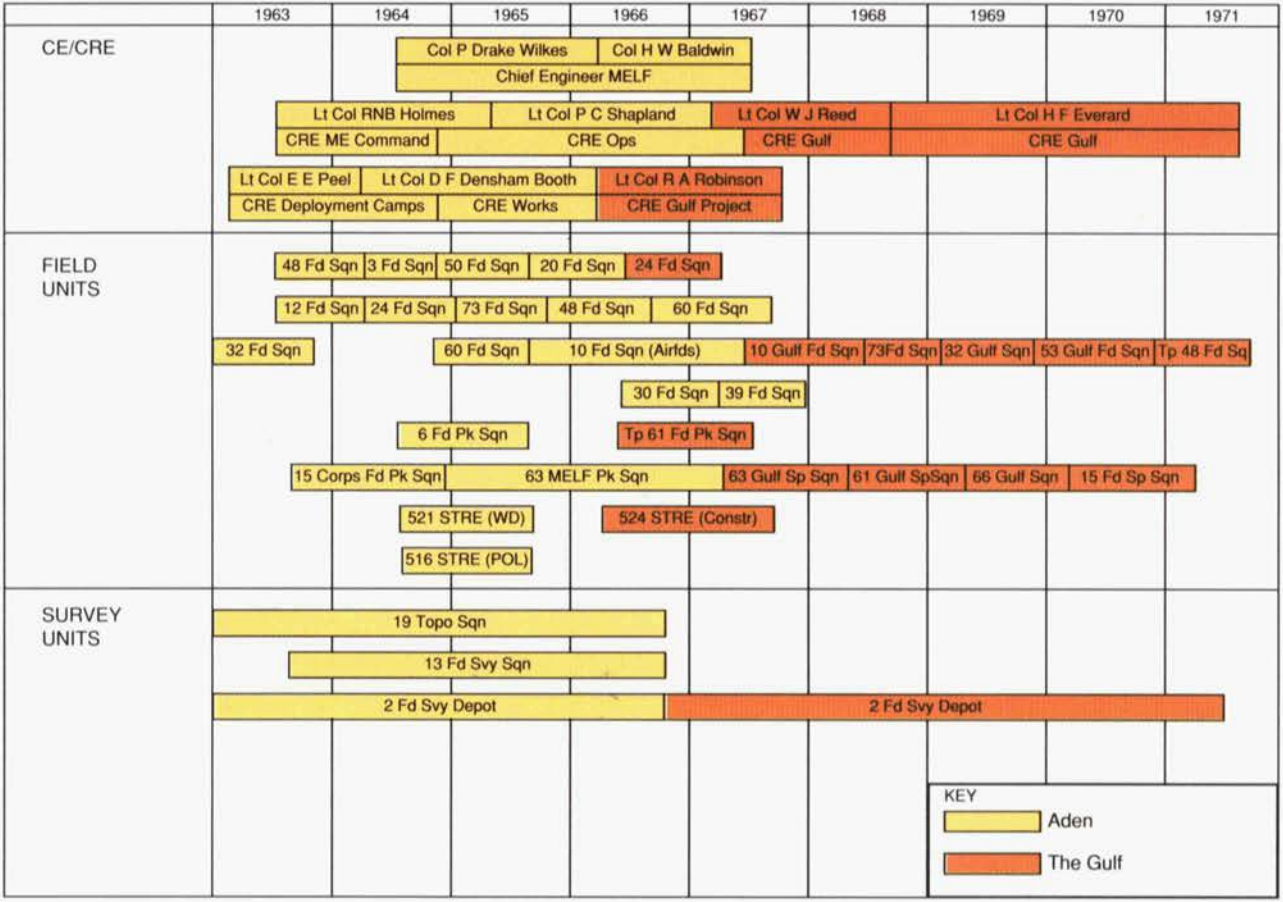


FIGURE 10. RE DEPLOYMENT IN ADEN AND THE GULF 1963 - 1971

The only answer an increasingly desperate OC could get to guide him in deciding what AFG1098 equipment should be his top priority air freight was "Well, it's rather like Vantage but definitely not the Vantage as planned. We think you will move direct to Kuwait but no-one is sure". Eventually on 2 July, the OC, his small tactical HQ and 2 Field Troop took off from Nairobi with 24 Infantry Brigade Advance HQ in a Rhodesian Air Force Canadair aircraft. After delays at Aden, and again at Bahrain due to a sandstorm closing Kuwait New Airfield, they arrived at 0420 hours on 4 July 1961. Commandeering a civilian bus, the 34 Squadron party arrived to join the general melee of reinforcements assembling on areas of pavement in the improvised staging area of the Shuwaikh Technical College.

24 Brigade Commander, Brigadier D G T Horsford, who had arrived earlier had to give orders successively to his unit commanders as and when they arrived in a somewhat unpredictable sequence by air from Kenya and elsewhere. 34 Field Squadron's orders were first to dig in and occupy a defensive position between the rear of the Mutla Ridge and the sea, covering any Iraqi advance around the western edge of Kuwait Bay. Second, to constitute a mobile force to deploy at very short notice to help defend Brigade HQ, collocated in Al Jahara Fort with Brigadier Mubarrak, the Kuwait Army Commander. Third, to undertake engineer tasks in support of the whole force established ashore. With its various "chalks" now arrived, 34 Field Squadron moved out to an area of barren desert north-east of Al Jahara, locally known as "The Hill of Shame", and dug itself in tactically.

The British force had arrived at the beginning of the hottest time of the year in one of the hottest parts of the world with shade temperatures often more than 140°F. Heat exhaustion was an ever-present risk and its prevention became a priority, especially for the Sappers whose tasks demanded hard physical work. Initially the Ruler of Kuwait had provided everyone with two free cans of very welcome fruit juice a day, but orders were soon given for this to be stopped, as was also the free "On Active Service" postal service the force had hitherto enjoyed. The heat often reached over 130°F by 0800 hours and, as the OC discovered in 34 Squadron's sand-scrape cookhouse one morning, was sufficient to hatch out ration eggs into baby chickens. The officially recommended quantities of water to be drunk per day were either 10 pints per man plus one extra pint

per hour of work, together with one salt tablet per pint: or from 12 to 22 pints per man plus 6-12 salt tablets: in practice the squadron operated on two gallons per day per head. Extra salt had to be added to bulk fluids such as soup, tea and "jungle juice"[4].

Engineer Tasks

The immediate sapper tasks undertaken varied widely. Desert "going" and route reconnaissances were commonly needed, as were the reconnaissance, selection and preparation of improvised desert airstrips for both the RAF and AAC. Units required assistance in the preparation of their defensive positions which included some wiring and the improvement of natural anti-tank obstacles by rock blasting. Water points and reservoirs were established for the battalions on the Mutla Ridge and at Arhaiya. There was also some laying of dummy minefields with metal composite ration tins representing the mines. Demolition reconnaissances of culverts and anything else that would impede an Iraqi advance were carried out, as was the continuous gathering of engineer intelligence.

Once the initial combat engineer tasks had been completed early in July the emphasis changed and now lay on improving the quality of life for the men living uncomfortably in the heat and sand - as indeed the squadron itself was doing. Sappers set up "S" tanks as improvised swimming pools for brigade units, constructed primitive showers, used powered augers to drill out deep trench latrines and rubbish pits, installed, repaired and maintained electric generators, built a stage in 27 Field Regiment's desert camp for a visiting Entertainments National Service Association (ENSA) party, and later built and maintained a brigade "Rest and Recuperation" camp at Shaiba. It also disposed of unsafe grenades and ammunition, provided simulation for brigade exercises, laid Sommerfeld tracking for a brigade beach landing exercise, was regularly exercised in its task of rapid re-deployment to defend brigade HQ and undertook the constant maintenance both of the brigade's airstrips and units' desert field defences.

One particular squadron task was unusual. Some of the RAF Hunter pilots were experiencing difficulty when flying low level in conditions of haze in knowing exactly where they were in the featureless Kuwaiti desert north of the Mutla Ridge. The RAF therefore asked the Squadron to "paint" a series of very large,

accurate map grid reference numbers directly onto the sand by which the pilots could orientate themselves. A sergeant was accordingly despatched, complete with a surveyor, oil bowser and several large watering cans, to do just that. The RAF were extremely grateful thereafter.

Logistic support for Operation Vantage was run by a Joint Administrative Headquarters (JAHQ) based at the Kuwait Technical College. Initially Engineer Works was covered by the GSO2 RE from HQ Middle East Command, but this responsibility transferred on 7 July to a CRE Works Kuwait and a team of five who were specially flown out from UK. The principal works tasks included improvements to the accommodation made available to the force by the Kuwait Government, the assembly of camp structures for Army and RAF units, and assistance with the provision of engineer stores and plant for 34 Independent Field Squadron and of defence stores for units of 24 Infantry Brigade.

The Arab League accepted Kuwait as a member on 20 July 1961. Tension in the area eased as the League's membership collectively assumed responsibility for ensuring the survival of its latest recruit by the provision of a strong military force from Arab League countries, excluding Iraq, which would take over from the British. The latter, having saved Kuwait from possible Iraqi invasion, could now start planning the withdrawal of its force. The formal agreement for the Arab League Force presence was signed by the Ruler of Kuwait and the Arab League's Secretary-General on 12 August. However, his Kuwaiti contacts told the OC at the time that there was no way that any Arab Force would ever take over from the British at the hottest time of the year: the participants would deliberately delay things until about 1 October when the temperatures became acceptable, and let the British "sit out the heat" meanwhile: and this is exactly what they did.

Handover and Withdrawal

Meanwhile, the withdrawal of British troops had started. On 21/22 July half of 34 Independent Field Squadron returned to Kenya, leaving the OC and a HQ element, 1 Field Troop and a composite troop in Kuwait. With the departure of units not organic to 24 Brigade and its role fulfilled, the Joint Administrative Headquarters closed on 27 July and CRE Works (Kuwait) handed over his responsibilities to OC 34 Field

Squadron. The latter, when he asked what the limits were to his financial powers both as CRE Works generally and for local purchase in particular was surprised to be given an official answer: "They are at your discretion, there are no limits". A rare Works moment indeed.

The Arab League Force troops from the United Arab Republic, Saudi Arabia, Jordan, Sudan and Tunisia started to arrive in September. The actual handover of unit positions was unconventional because Arab protocol apparently forbade any discussion, direct contact, physical handover or the passing over of any information between the British and their relieving opposite number Arab unit commanders. Positions were abandoned and taken over therefore in an extraordinary vacuum.

34 Independent Field Squadron's final task was to plan, supervise and undertake the "March Out", variously with the Kuwait Army, the Kuwait Government Housing Department, the Kuwait Oil Company and a firm of German Contractors, of all the accommodation ever occupied by the Joint Task Force ashore, and obtain clearance certificates for it all on behalf of the British Government. The OC finally abandoned his Squadron's desert position on 1 October and withdrew back into the Technical College with Commander 24 Infantry Brigade and his small staff. The remaining members of the squadron started flying back to Kenya on 1 October and the final 24 Brigade party, including the OC, left on 10 October 1961. 34 Independent Field Squadron had arrived on the first 24 Infantry Brigade aircraft "chalk" into Kuwait and had finally left on the last one out; its Sappers had in fact endured the gruelling Kuwait open desert conditions longer than any other unit which had served ashore on Operation Vantage.

KENYA

RE Organization

By 1960, the last remaining British colony on the mainland of Africa was Kenya, a beautiful country providing happy memories for many Royal Engineers. By January of that year when the Mau Mau emergency ended, it was a country of relative political and internal peace. Against this background, and in anticipation of a long stay, a large cantonment was built at Kahawa, a few

miles from Nairobi, to hold two battalions of the independent infantry brigade group planned for the colony. The project was of particular interest because the site supervision was in the hands of Lieut Colonel J R de G Pilkington, who had been appointed CRE (Works), with an almost wholly military staff. The foundation stone was laid on 18 July 1960 and the barracks were named Templer Barracks after the Chief of the Imperial General Staff in post when the project was originally conceived.

The Corps' combat engineer unit in Kenya was 34 Independent Field Squadron of the resident 24 Infantry Brigade Group. A strong squadron consisting of headquarters, three field troops and a park troop, it had to maintain a continually high state of readiness to move at short notice by air - as part of 24 Infantry Brigade Group - for operations in the Arabian Peninsula or Persian Gulf area, such as that already described above in Kuwait. It was based in its own small camp alongside the airstrip at Gilgil, some 80 miles north of Nairobi.

Although primarily tasked by 24 Brigade the squadron was from time to time called upon variously by Headquarters East Africa Command in Nairobi, which had no Chief Engineer but coincidentally had both Chief of Staff and Brigadier A/Q appointments filled by Sappers, by the CRE (Works) and by the Kings African Rifles Brigade in Nanyuki which had no engineers of its own. Resolution of conflicting demands gave plenty of scope for variety in the selection of tasks by the squadron commander and between January 1961 and September 1962 the whole squadron was only together in its Gilgil barracks for five days. During this period it operated or had detachments deployed in Aden, Bahrain, all of Kenya and most of Uganda as far afield as the Ethiopian, Somalian, Ruanda Urundi and Congo borders, Kuwait, Tanganyika, the Trucial States, Zanzibar, and Southern Rhodesia.

When 24 Brigade with 34 Field Squadron under command were dispatched to Kuwait at short notice in July 1961 it was not anticipated that their absence would be prolonged, but 19 Infantry Brigade at Colchester was alerted to take their place in Kenya. On 7 July the main body began flying out from the United Kingdom, including 3 Independent Field Squadron who on arrival in Kenya occupied part of the barracks at Gilgil. The area was not unknown to some of them as troops from the same squadron had trained there with the battalions they supported the previous Autumn and Spring.

Flood Relief

No sooner had the emergency in Kuwait subsided and 24 Brigade begun to return to Kenya than another, natural, storm broke, this time on the colony itself. In the autumn of 1961, after two successive years in which the rains had failed, the heavens opened in unprecedented strength. Landslides occurred in the mountains, new lakes and rivers were formed and innumerable roads and bridges were washed away. Lake Victoria with a surface area of 21,000 square miles, rose three and a half feet; Kenya's main river, the Tana, flooded an area of about the size of Wales between the town of Bura and the sea.

The Ministry of Works in Nairobi did their best through their normal chain of representatives throughout the country to cope with the disaster, but the most they could do was to concentrate on the reopening of a few main routes. Thus it fell to the Royal Engineer units in the colony at the time to turn to and help.

In October 1961 when the emergency arose there were available in Kenya elements from several units; 3 Field Squadron (who were about to return to UK), 34 Independent Field Squadron (fresh from Kuwait) and a troop of 23 Field Squadron who happened to be training in the theatre with their battalion as part of a regular six monthly commitment.

The most urgent task was route reconnaissance and damage assessment, particularly in the Garissa-Galole-Garsen-Malindi areas and detachments were deployed accordingly. Then quite suddenly, the swollen Sabaki river swept away the major bridge on the coast road just north of Malindi. Captain Burnet of 34 Independent Field Squadron with a troop of 3 Field Squadron, were first on the scene. They constructed an improvised Class 12 raft to keep communications going and also carried out flood damage reconnaissances beyond the river towards Garsen. The raft was later replaced by an improvised aerial ropeway and this carried across many tons of vital food supplies and local trade before its far pier was undermined months later and the raft came back into service.

With the return of the OC and the remainder of 34 Independent Field Squadron from Kuwait, 3 Field Squadron returned to UK in mid-October. The tempo of flood work increased, however, and before long detachments and field troops from 34 Field Squadron were deployed and hard at work with route repair and aerial ropeways in the Kajiado, Machakos and Kitui areas. In many other parts of Kenya routes and

possible alterations had to be constantly patrolled under squadron arrangements in order to keep up with the situation generally and, in particular, to assess the effects of the floods on 24 Infantry Brigade's deployment plans for other types of operations. At the peak of the crisis in November the whole of 34 Independent Field Squadron (which included a large Park Troop), less one Field Troop kept permanently on operational standby, became committed to Flood Relief.

With the planned return of the troop from 23 Field Squadron to UK in November, it was realised that reinforcements would be needed for 34 Squadron and, accordingly, a small Tactical HQ (under Lieut Colonel A E Younger) and 24 Field Squadron, both from 36 Corps Engineer Regiment, arrived on 21 November 1961 from Maidstone. 24 Field Squadron moved into Rifle Range Camp in Nairobi and Tactical HQ 36 Regiment into HQ East Africa Command. The repair of roads and replacement of bridges continued throughout the area even as the floods began to subside and make the extent of the damage more apparent. Dispersion between the sub-units was enormous and valuable combat engineer experience gained in a wide variety of tasks, many of them improvised, though opportunity arose (as at Garissa where an Inglis bridge had been swept away) for construction of a LFB ferry and many Bailey bridges.

Lieut Colonel Younger returned to the UK early in January 1962, but 24 Field Squadron remained, initially working in the Kitui and Machakos areas where it had relieved 34 Independent Field Squadron at the end of November. Of particular interest was the opening up of the Namanga-Amboseli-Laitokitok road, familiar to visitors to the Amboseli Game Reserve and to climbers of Kilimanjaro, by 1 Troop. Later on, as work was completed and priorities changed, the troops were redeployed further and further afield.

By 1 April 1962 the bulk of the flood emergency tasks were over and 24 Field Squadron returned to its parent regiment. 34 Independent Field Squadron meanwhile was deployed to other tasks including the preparation of an all weather airstrip and access tracks in the troublesome Uganda border areas.

The Training Agreement

On 12 December 1963 Kenya achieved independence but her military ties with the United Kingdom remained, including the presence of a British Army Training Team (Kenya), BATTKEN,

which was housed in the cantonment so recently completed at Kahawa, now handed over to the Kenya Army. British troops continued to train in the area under an agreement whereby a United Kingdom Strategic Reserve battalion, complete with its affiliated Royal Engineer troop, could conduct a six week exercise in Kenya twice a year. The amount that a troop could achieve which would be of lasting value was obviously limited however, and it was hoped therefore that the agreement would allow for an increase in the level of Sapper activity whenever the opportunity arose.

Construction Projects

In October 1964 34 Independent Field Squadron was finally withdrawn and moved to Tidworth to join 3 Division Engineers. The main tasks carried out before they left were the provision of assistance to the Hydrological Department of the Kenya Government by the construction of a cliff path blasted out of rock in the Lake Chala area and a steel jetty in 70 feet of water. Other work included the construction of a two mile causeway in the North East Region and cutting and grading the alignment for a new 100 mile road to connect the Regional Capital, Garissa, to the trade centre of Wajir.

Four years later much of the squadron returned, this time under the training agreement. In January and February 1968 two troops accompanied 3rd Battalion Royal Anglian Regiment to the Aberdare National Park area to carry out engineer tasks requested by the Kenya Government. The exercise, known as Leyton, included the construction of two timber bridges, repair of several culverts and opening up of new tracks. Later the same year 8 Field Squadron carried out similar work, codenamed Street, over the period 1 September to 20 November on the Mau escarpment area, followed consecutively by 9 Independent Parachute Squadron and 48 Field Squadron, each for a period of four months.

In the same year the Chief of Defence Staff Kenya Army wrote to the Engineer-in-Chief (Major General J H S Bowring) asking for help in the exploration for and drilling of water wells to help in the development of North East Kenya. After a reconnaissance led by Major J C Peacey in May, 521 Specialist Team flew out from the United Kingdom in October 1968 with a Speedstar rig to carry out the task, known as Project Bornite. They remained in Kenya for a nine month unaccompanied tour, during the course

of which they drilled 18 wells in the area North of Wajir and found water at seven of them.

Over the years construction projects increased in scope and 1970 saw a reconnaissance team from 62 CRE (Construction) recommending 12 possible projects for future years. 20 Field Squadron moved to Kenya in January 1972 and for the next three months constructed and repaired roads and built a 100 metre long light aircraft landing strip on Exercise Palmer. Another major enterprise was the construction of an earth road nine miles long from Magenche to Nyangusu in Nyanza west of Nairobi. Because of the uncertain political situation in adjacent Uganda, the start of this project, known as Facula, had to be delayed, but in due course 53 Field Squadron (Airfields) moved to Kenya in January 1973 to carry out its construction which they completed by 24 March. Other road projects were carried out in 1974 by 60 Field Squadron (Exercise Bullet) in the Aberdare National Park and elsewhere, in 1975 by 59 Independent Commando Squadron (Exercise Mousetrap) at Mtetei valley, and in 1976 by 48 Field Squadron (Exercise Sulphurous) on the Treffos road. In 1977 52 Field Squadron (Airfields) (on Exercise Square Frame) built a 25 metre single span bridge and approaches over the Mara river west of Nairobi and in the following year 53 Field Squadron (Construction) built a school and carried out minor improvements at Kahawa (Exercise Full Pride).

In 1977 a detailed reconnaissance was carried out by 62 CRE (Construction) for the construction of a 100 foot triple single Bailey bridge over the River Gucha, 180 miles west of Nairobi, with a view to its construction as a training exercise in 1979. However in March 1978, while an MOD team were visiting Kenya in connection with possible military sales, they learnt that the Kenya Government had plans for basing an armoured regiment at Isiolo and that temporary accommodation at Lanet was required for the tanks while the permanent base was being constructed. 50 Field Squadron (Construction) which had originally been earmarked for the Gucha Bridge project was now tasked with carrying out the Lanet works instead, which it duly did from January to April 1979 under the codename Larchpole 1. The project included the construction of single storey buildings to house the armoured regiment and the conversion of existing hangars into workshops and technical stores and was notable for the excellent local co-operation received. This was

due in part to the fact that the work was being carried out not for the Ministry of Works, as had invariably been the case on previous exercises, but for the Kenyan MOD whose staff were readily available to provide procedural support and even the loan of a troop of Kenyan Engineers. The following year between January and May, the Gucha River Bridge was completed, together with approach ramps and associated roads, by 32 Field Squadron under the codename Exercise Larchpole 80.

By the end of the period with which we are concerned, just as the game parks of Kenya had become a major attraction to the tourists of the world, so had the plains and uplands of the same land become a valued training area for the British Army. This account of Royal Engineer activity of the time serves to show that in this theatre at least transition from garrison force to invited guests could be made in harmony and peace to the mutual benefit of those concerned.

FOOTNOTES TO CHAPTER VII

1. One such remote location was in the Emirate of Ras al Khaimah. As frequently happened when a troop set up camp at a remote worksite, it immediately became a meeting place for the local Arabs. Such a group came to the encampment and one member began to admire a pair of binoculars which a sapper had recently bought in the NAAFI. Having been well briefed that it was the local custom to offer to an Arab that which he admired, the sapper gave the binoculars over. Greatly surprised by this gesture the Arab took the Troop Sergeant aside and paid for the binoculars and three days later returned to invite the troop to a local wedding. The sergeant and two sappers accepted and drove a landrover as far as they could up a mountain track and then had to take to their feet. After a considerable climb they came upon a mountain village and were welcomed as honoured guests at the ceremony. On reporting the event subsequently to their intelligence officer at Sharjah, it transpired that they were the first white men known to have penetrated into that area.
2. In the Arab world no apology however relevant could retrieve such an insult once uttered and on this occasion the effect was felt mainly at the social level. The Ruler of Bahrain promptly cancelled the weekly horse and camel racing which though of no great equestrian consequence was an event well attended by the expatriate population in Bahrain for whom there was little enough entertainment as it was.
3. See Volume X.
4. A lemon flavoured concoction made by dissolving in water the bright yellow crystals supplied.

CHAPTER VIII

THE MEDITERRANEAN

INTRODUCTION - CYPRUS - Historical Background - Political Changes - Organization - Operations and Training - Kings Field Airstrip - Akrotiri Harbour - Civil War of 1974 - Demarcation Survey - Nicosia Airport - GIBRALTAR - RE Garrison - Electricity Generation - Tunnelling - Military Aid to the Civil Community - Emergency Tasks - Bicentenary and Freedom Ceremonies - MALTA - Introduction - RE Organization - Training and Operations - Specialist Team Projects - LIBYA.

INTRODUCTION

In 1960, the Mediterranean was still an area of considerable British influence. Military control was exercised from a Joint Headquarters at Episkopi in Cyprus, whence it had moved from Egypt in 1955, retaining the title Middle East Command. Its responsibilities included Cyprus, Malta, Libya, Kenya and the Arabian Peninsula, though Gibraltar remained an independent command. By this time, however, a major portion of Britain's obligations in the Mediterranean were being shared with, if not taken over by, her NATO partners. In the 1962 Government Statement on Defence it was made clear that the main base for the Royal Navy in future was to be the United Kingdom, with forward operating facilities only in Gibraltar and Malta; though both places would continue to provide airfields for the RAF and would require small local garrisons for their protection. The main base for our air strike force in support of CENTO and for the location of NATO early warning facilities and radio communications would continue to be Cyprus, and the land forces in the Sovereign Base Areas were there to safeguard these facilities and to maintain stockpiles needed for any rapid reinforcement within the theatre. Under an existing treaty with Libya, Britain was pledged to help in its defence against any external aggression and for this purpose an infantry battalion would remain in Tripoli and the RAF had use of staging facilities at El Adem. In return Libya offered excellent training opportunities for British Army units. These then were to be our sole remaining commitments in the Mediterranean. However, our presence in Libya and Malta was not to last as we shall see, and by early 1980 our total deployment in the area had dwindled to an enlarged battalion group and two RAF

squadrons in Cyprus (plus a small United Nations contingent) and a Royal Navy Carrier, one Destroyer, a single infantry battalion, a Specialist Team RE and a few Gunners, on Gibraltar.

This chapter looks at those countries in the Mediterranean area where the British presence continued for at least part of the period. The Corps as usual found itself providing a typical mixture of operational support to all three services, project work for improvements to the local quality of life, military aid to the civil community (MACC), and disaster relief.

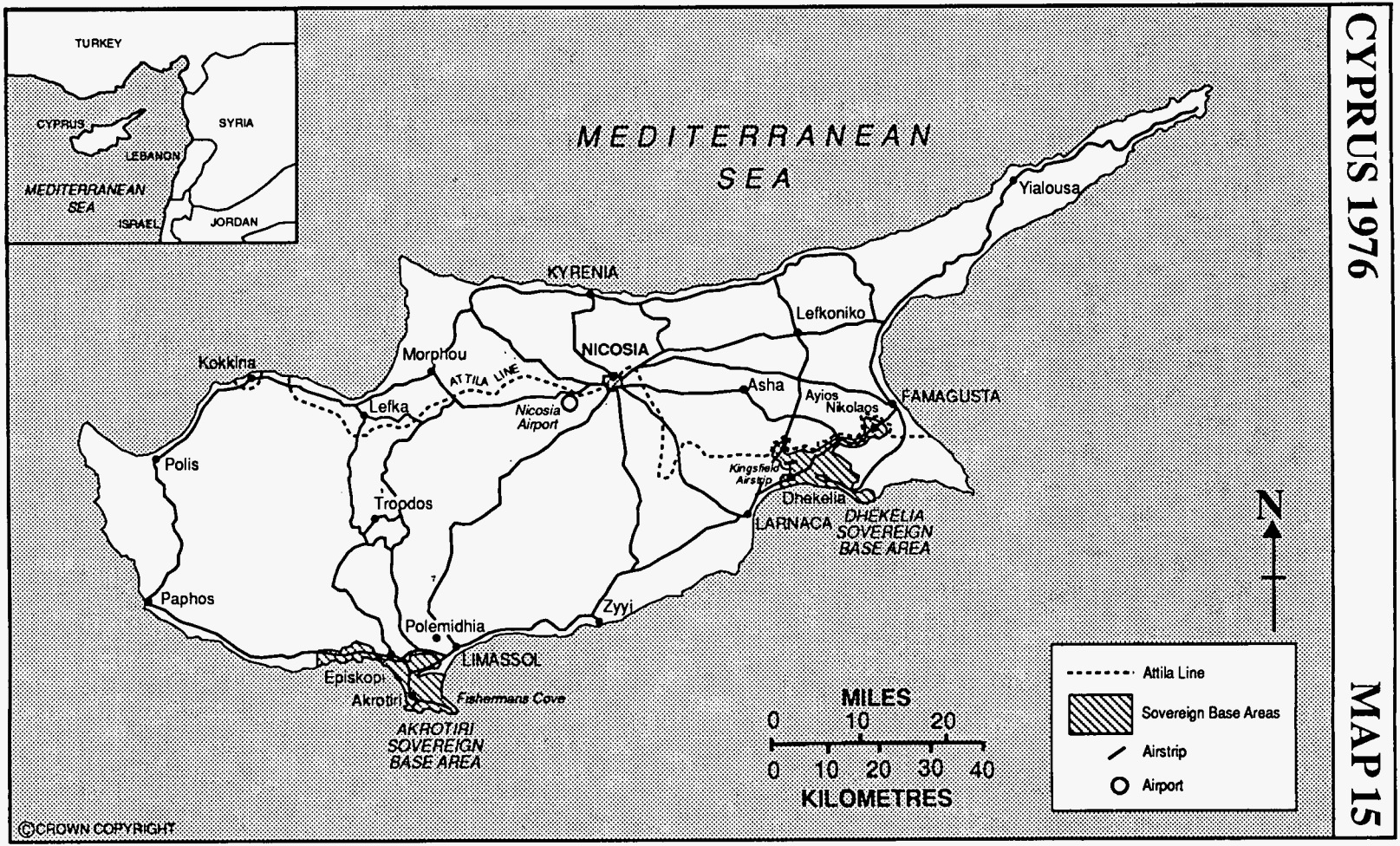
CYPRUS

Historical Background.

Over the years, Cyprus had known many masters including Egyptians, Romans, Persians, Venetians, and Turks. Great Britain leased the island from Turkey for common defence against Russia in June 1878, and an occupying force (which included 31 Company RE under Major J R M Chard VC of Rorkes Drift fame and a survey detachment under Lieutenant H H Kitchener) landed in July. The island continued as leased territory until the outbreak of war with Turkey in November 1914 when it was annexed, becoming a Crown Colony in 1925. It remained as such until achieving independence in 1960. Despite its close association with Turkey an increasing number of inhabitants were of Greek origin, by the start of this period outnumbering their Turkish compatriots by about four to one. For the next twenty years British soldiers serving on the island could find themselves either basking in the tranquility of a peaceful land of great archaeological interest or caught up in a vicious round of violence and terror.

Political Changes.

In February 1959 the EOKA revolt which had begun on 1 April 1955 by Greek Cypriot terrorists against British Colonial rule, came to an end. By that time, the three powers with a major interest in the island - Greece, Turkey and Britain - had found a basis for agreement on the future status of the colony, which as a result became an independent, sovereign republic on 16 August 1960. The island remained strategically important to Britain both as a base for possible operations overseas and also because of its value as a communications relay centre. It was therefore agreed that the British should retain their military bases in the


CYPRUS 1976
MAP 15
TURKEY
CYPRUS
SYRIA
LEBANON
MEDITERRANEAN SEA
ISRAEL
JORDAN
MEDITERRANEAN SEA
KYRENIA
Yialousa
Lefkoniko
NICOSIA
Morphou
Kokkina
ATTILA LINE
Nicosia Airport
Asha
Ayios Nikolaos
FAMAGUSTA
Lefka
Polis
Troodos
Kingsfield Airstrip
Dhekelia
LARNACA
DHEKELIA SOVEREIGN BASE AREA
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Sovereign Base Areas
Airstrip
Airport
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south of the island at Akrotiri and Episkopi (near Limassol) and Dhekelia (near Larnaca), and that these should remain Sovereign British territory. Thus the two Sovereign Base Areas (SBAs) were born.

The agreement was unpopular, however, with a majority of the Greek Cypriots who felt that under its terms the Turkish minority had been granted disproportionate benefits, in particular in respect of their share of government posts and the presence on the island of a permanent Turkish army contingent. Enmity between the two communities grew until in December 1963, civil war broke out between them. The British government, as part-guarantors of the agreement, rushed a peacekeeping force to the island, but their task was particularly difficult as memories of the recent Eoka campaign remained fresh in too many minds and soon their replacement by a United Nations force was demanded by the President, Makarios. In March 1964 a United Nations Force in Cyprus (UNFICYP) totalling some 7,000 men from Britain, Canada, Denmark, Sweden, Finland and Ireland was set up to keep the peace at that time. Following the violence, which still continued spasmodically, Turkish Cypriots living in mainly Greek communities began to move to predominantly Turkish areas of the island, and by 1967 were concentrated almost entirely in enclaves in the North and West of the island. Turkey had for long advocated that the island should be partitioned and when in November, a particularly violent attack was made by the Greek Cypriot National guard on two Turkish Cypriot villages, they threatened to enforce this solution by moving troops on the mainland to the coastline opposite the island.

The uneasy peace continued until 15 July 1974 when the government was overthrown by a Greek military coup which installed Nicos Sampson (a former EOKA hero) as President. Makarios himself narrowly escaped capture by fleeing to Paphos, whence he was flown by UN helicopter to Akrotiri and by RAF to Malta. This coup provoked the Turkish government into landing troops on the northern coast of the island, ostensibly to protect the minority community, from where they advanced towards Nicosia. A cease fire was arranged on 22 July but further fighting took place and negotiations foundered. By 16 August the Turks were in full control of the island north of the "Attila Line" which ran from Famagusta, through Nicosia, to Kokkina. In so doing

they had relieved the besieged Turkish Cypriots in Famagusta but, conversely, about 10,000 Cypriots had fled from the occupied territory, many of them to the security of the British base of Dhekelia.

Turkey had gained considerable territory for which she was widely condemned by the outside world, and in protest against which Greece withdrew from the military structure of NATO. Thereafter, for the remainder of the period covered by this history, the island was effectively partitioned with little contact between the two localities. Although UNFICYP patrols were theoretically free to roam the island, the Attila cease fire line formed an effective barrier for everyone else between the two provinces with one carefully controlled access point in Nicosia. The Government still technically held authority over the whole island and was recognised internationally as the constitutional body representing the Republic. Effectively, however, it was a solely Greek Cypriot institution controlling the South because the Turkish Cypriots had set up unilaterally a Turkish Federated State of Cyprus to manage their local affairs in the North.

Organization

In 1960 Army deployment in Cyprus consisted of 3 Infantry Brigade Group with battalions in Dhekelia and Polemidhia, a signal regiment at Ayios Nikolaos near Famagusta and various Army units in the Episkopi and Limassol areas and in Nicosia. RE units in support were the brigade Sappers, 33 Independent Field Squadron at Dhekelia, the Cyprus Park Squadron in Famagusta, 42 Survey Engineer Regiment near Polemidhia, and 275 Postal and Courier Unit RE. With the departure of Middle East Command to Aden the same year these units came under the command of CRE Near East Land Forces in Dhekelia.

In 1962 HQ Near East Land Forces closed down and the area was divided into two districts (Cyprus and Malta/Libya). HQ Cyprus District opened, with all Engineers under command of CRE Cyprus, at Slim Barracks, Dhekelia. In March 1964, when UNFICYP was set up, an RE detachment of about troop strength was included. This was normally manned by volunteers from 22 Engineer Regiment in England, except in 1975 when it was provided by 59 Independent Commando Squadron.

In 1967, 33 Field Squadron was withdrawn to the United Kingdom. A CRE remained to plan and control engineer work in

the island which was normally conducted by reinforcement units. Support was provided from a composite squadron, 62 Support Squadron, which was located at Dhekelia and included an Engineer Park. A further change took place in 1970 when CRE Cyprus took over responsibility for support to British Troops Malta. In 1976, HQ RE closed and by 1980 62 Cyprus Support Squadron, reduced in strength to three officers, forty-eight soldiers and eighty-one civilians, was the only RE unit stationed permanently on the island.

Operations and Training.
The period from 1960 to 1963 was one of relative peace. Cyprus-based units trained both within Cyprus and in Libya where training rights were still enjoyed, but the civil war of 1963 rudely upset this programme of training and projects and 33 Squadron found themselves for a period in the front line as part of the force holding the ring until a peacekeeping force could be mounted from UK.

Kings Field Airstrip.
Then in 1964 the operational situation led to the resuscitation of an earlier plan to build an airstrip at Kings Field[1], Dhekelia, capable of taking the current medium range transport aircraft, to provide better communications between the two SBAs. A preliminary reconnaissance took place on 2 March, but difficulties over requisitioning the land and other political considerations did not allow deployment to the site until 24 March. The technical problems of building an airstrip with a minimum 30 day life were not great and the readily available soft havara limestone made an ideal fill material, compacting quickly with only surface rolling. Only twenty days after the arrival of the first machines on the site the airstrip was formally opened by CinC British Forces Cyprus, Air Chief Marshal Sir Denis Barnet, and the first Beverley landed without hitch.

Akrotiri Harbour
A rather long drawn out affair was the development of Akrotiri Harbour. As a contingency against the possibility that port facilities at Limassol were not available for any reason, or the road link between Western and Eastern Sovereign Base Areas had been cut, or because particularly sensitive cargoes or

awkward loads had to be handled, there was a requirement for a harbour to be built in the area.

Known as Operation Neptune, the project was to include the construction of:

A 750 foot long dog-leg shaped main mole.

A 100 foot long spur breakwater at the harbour entrance.

A piled vertical mole wharf integral with the inner length of the main mole, for use by Z and other craft.

A concrete ramp for use by Z craft and Ramp Powered Lighters.

The CRE Cyprus Lieut Colonel M J Andrews, was ordered in May 1964 to reconnoitre possible sites for a mole and undertake preliminary planning for an emergency shelter for Z craft to be constructed before the end of 1964. Although the site at Fisherman's Cove was decided in June, work could not start until September because of the operational situation. Nevertheless a useful breakwater was achieved before the winter storms, 455 feet in length, and providing shelter for Z craft during some very bad weather in December.

Further development took place during 1965. A higher specification was drawn up and plans made for improved approach roads, parking area and slipways. In-theatre troops were used for the project and work proceeded against the clock from March to November, by which time 80,000 tons of rock and 20,000 tons of havara had been emplaced. The resulting harbour was available until the exceptionally severe weather of the winter of 1968/69 resulted in the collapse of the mole.

Funds were immediately requested for its reconstruction and it was plain that an even higher specification was required. Design was placed in the hands of the Defence Works Organization. The Property Services Agency (PSA) based at Episkopi were to be responsible for financial control and general site supervision and the work would be carried out by a Project Team provided from UK with a field troop in support provided variously from within Cyprus by 62 Support Squadron and from UK by 50 and 51 Field Squadrons.

To provide the rock for the mole a new quarry was opened on the cliffs barely six hundred metres from the mole. A total of 151,000 cubic yards of material in the solid was won by blasting, the aim being the unusual one of minimum fragmentation in order to produce the maximum number of 4 ton or heavier armouring rocks. In winning the quantity of large armouring required inevitably much smaller hearting material was also produced and about 70% of the material won could not be used. Because of the unfavourable sea conditions in winter and shortage of labour a buffer stock was built up before actual construction began. This preliminary work, together with underwater blasting and dredging, took place from September 1972 to April 1973 although quarrying continued until September 1973.

Construction of the mole, using the original to form the core, started in May 1973 for which rock was placed from both land and sea. Bulk placing was by tipping from dump trucks while accurate placing and final shaping was done by an excavator and Owen Grab handling individual rocks. When placing from the sea was required, these equipments were carried on a modified Mexeflote Raft, and on occasion rocks were also placed by pushing them from the edge of this raft with a medium wheeled tractor. Some 600 cubic yards of mass concrete was required to be placed for the retaining wall of the wharf, largely underwater. The wall was backfilled with hearting material and a temporary surface of havara gravel and crusher run stone was laid. A suitable filler material was used immediately behind the wall above water level, to relieve excess water pressure during heavy rain or storms, the mole itself being porous. A roll-on roll-off ramp, known as the Malta Ramp, existed already but the front had been undermined during necessary dredging operations and the ramp slope and shape were also unsuitable. A new foundation, facing wall and slope, had to be built after lengthy preparatory work on the existing structure. This seemingly simple task proved to be even more difficult than the main wall underwater construction, largely because there was no easy method available for anchoring the single skin wall formwork. Despite these and similar problems, the project was finally completed in February 1974.

At this time two ramped powered lighters (RPLs) were based in the harbour and it was necessary from time to time to remove them from the water for maintenance purposes. It was therefore

now decided to modify the slipway to enable the vessels to be shipped out of the water. A suitable design was produced by 525 STRE(V) and the work, which involved the construction of two mass concrete plinths running 50 metres out to sea and 54.5 metres onshore, a reinforced concrete slab and the laying of rails to take the slipping trolley, was carried out over the period 21 July to 27 August 1975 by 48 Field Squadron of 38 Engineer Regiment.

Later the same year HQ NEARELF submitted a proposal to MOD for a landing ship logistic Roll-on-roll-off jetty as an extension of the Mole project, for which 60 Field Squadron was tasked in February 1976 and deployed to Cyprus in June. The project entailed the construction of:

A twin cell jettyhead.

Two cellular mooring dolphins.

A bridge abutment on the existing mole.

A HGB (187 feet 6 inches long) to span the gap from the mole to the jetty head.

Construction started on 3 June 1976 and was completed, after delays due to rough seas, on 28 October.

Civil War of 1974

Although the British Army was not directly involved in the Greek/Turkish fighting of July 1974, they faced the inevitable problems of greatly enhanced guard and administrative duties, including looking after their own families and separated personnel. Most of the work resulting from the emergency was carried out in support of and in co-operation with the PSA, but many of the anticipated problems with essential services through the withdrawal of local labour and political disruption never materialized and the fifty-eight individual RE tradesmen who were sent to reinforce the CRE for varying periods between 23 July and 3 September were only occasionally required for electrical and plumbing work. However, they and troops from 8 Field Squadron, 24 Field Squadron, 59 Independent Commando Squadron and 60 Field Squadron, together with the

resident 62 (Near East) Support Squadron, were more than fully occupied with temporary camp construction for refugees, at one time numbering ten thousand Turks in Episkopi and twenty-four thousand Greeks in Dhekelia. The task of constructing and improving such camps proved difficult to plan as the whole matter was highly charged politically and estimates of numbers and the length of their stay were subject to constant revision. Five temporary camps of varying degrees of permanence were built, of which two at Episkopi for Turkish refugees and one near Dhekelia for their Greek counterparts continued to be used in the rainy season and required a winterization programme. In most cases standard camp-structure packs were adapted for use as toilets, showers, wash benches and cookhouses, while timber and corrugated iron ration stores and slaughter houses were custom built. Electric power from the mains or field generators was distributed by overhead cable, water was piped variously from Braithwaite tanks supplied either from bore holes or existing reservoirs, surface water drainage was dug, while sewage and foul water was disposed of (with some difficulty in the rocky soil) in cess pits and soak aways. Perhaps it was fortunate that the Colonel AQ at Headquarters Cyprus District was a Sapper, Colonel J P Groom, so that when the emergency came little time was lost in mobilizing the engineer effort and obtaining funds from UK. Ultimate authority had to be given by the Quartermaster General who, as it happened, was also a Sapper, General Sir William Jackson.

The work reflected great credit on the Engineer Parks and the transport organizations both within Cyprus and in UK. Stores and equipment were quickly supplied and transported, sometimes in unconventional ways: for several months while the bases in Cyprus were cut off from each other by road, stores from the Engineer Park at Dhekelia came to Episkopi by Hercules aircraft from Kingsfield or even along the coast by Royal Fleet Auxiliary or Ramp Powered Lighter.

The majority of the RE work on the refugee camps was completed by the end of November 1974 and the last reinforcement troop departed then, although the Turkish Cypriots remained in the Western SBA camps until early 1975.

Demarcation Survey

Royal Engineers were also involved in establishing a line of demarcation between the warring sides. The peace declaration

made at Geneva on 30 July called for the setting up of a committee from both sides under the British Defence Adviser to establish the limit of area occupied by the Turkish Armed Forces. Lieut Colonel T A Linley, of the Survey Directorate Near East, was in attendance on the committee and a special survey cell manned by 1 Air Survey Liaison Section from Episkopi was formed. Thereafter, by a combination of helicopter and ground borne surveys the line of the forward Turkish positions both in the country and across the city of Nicosia was established - though not always to the mutual satisfaction of both parties. By 9 August agreement had been reached and the chairman flew with the appropriate maps to Geneva that afternoon. Much of the effort was in vain, however, as the talks broke down the next day, the Turks renewed their offensive and the demarcation line had changed significantly by the time peace was restored a week later.

Nicosia Airport

During the civil war the importance of Nicosia International Airport had been recognised by both sides and the United Nations became involved in the struggle for its control. During the period 20 to 22 July 1974, the airport was attacked by Turkish aircraft, as a result of which both the main and secondary runways were put out of action. When peace was restored the airfield remained a United Nations protected area and neither side was allowed access to it. However, in an effort to help the two sides to come to some eventual agreement, the United Nations offered, during the Vienna talks of 1975, to repair the airfield but the delicacy of the situation demanded that the whole operation be carried out by neutral troops. As a result the British Government was approached to carry out the repairs on a full cost basis using only military manpower and the British contingent of UNFICYP was temporarily boosted by a composite engineer force.

The force used for the task was the Cyprus Support Squadron reinforced by an additional field troop from 48 Field Squadron and a platoon of one of the resident infantry battalions, the 1st Battalion Devon and Dorset Regiment. The overall command structure of the Cyprus Support Squadron was used as control and was assisted by the addition of specialists from UK.

Planning for this unusual task was hampered by the lack of access to the site and also by the volatile political situation. As a

result it had been assumed that the task was unlikely to materialize and even if it did would be undertaken by civilian contractors. In the event, when in May the go-ahead was given, the operation had to be mounted at speed. It was only then that the magnitude of the task could be determined when limited digging out of craters and runway clearance was possible. A joint RE and PSA investigation recommended that the work be phased, starting with patch repairs to both runways and taxiways and ending with the resurfacing of both runways completely. Their report was produced on 23 May and eight days later 62 (NE) Support Squadron was instructed by signal from the MOD to commence work on 3 June. The instruction was to carry out work to stage one only, the patch repair of all damage.

A detailed reconnaissance carried out in May revealed that there were sixteen major bomb craters in the runways, several thousand smaller craters and scabs, two large areas requiring repair where a Trident aircraft had been set on fire, and another large area of scabbing at the main runway touch-down point.

The task was completed on 8 July by the military force. As no civilians could be employed all contractors' vehicles delivering materials to the site had to be driven by military drivers once they crossed the airfield boundary. It was an interesting project in which the Royal Engineers were once again able to demonstrate their versatility and in which they were admirably served by the unskilled but enthusiastic help of the platoon of infantry who were all volunteers from their battalion. The work was controlled by the PSA/DOE with whom excellent relations were maintained, who provided all the materials, and who showed commendable flexibility in helping to keep the work on time, a major factor as the client was paying for the manpower and plant hire charges.

GIBRALTAR

Royal Engineer Garrison

In 1960 the Royal Engineer field force establishment in Gibraltar consisted of a Fortress Engineer Regiment of two squadrons (1 Fortress Squadron and 32 Construction Squadron) under a CRE. Reductions in the garrison in 1961 however resulted in the move of 32 Construction Squadron to the United Kingdom in

July where it joined 38 Corps Engineer Regiment at Ripon as a field squadron. The Headquarters of the Fortress Regiment was disbanded, OC 1 Fortress Squadron was designated Officer Commanding Royal Engineer Troops, Gibraltar and the Squadron was reorganized on a four troop basis: Headquarters, Tunnelling, Power Station and Park Troops. In 1963 however it reverted to three troops when Park Troop became a section in Headquarters Troop. With the transfer of responsibilities over the next few years to other agencies, in particular tunnelling to the MPBW, the Squadron was later reorganized into Headquarters and Power Station Troops only; the military capability was further reduced when on 1 April 1978 1 Fortress Squadron reorganized as 1 Fortress STRE.

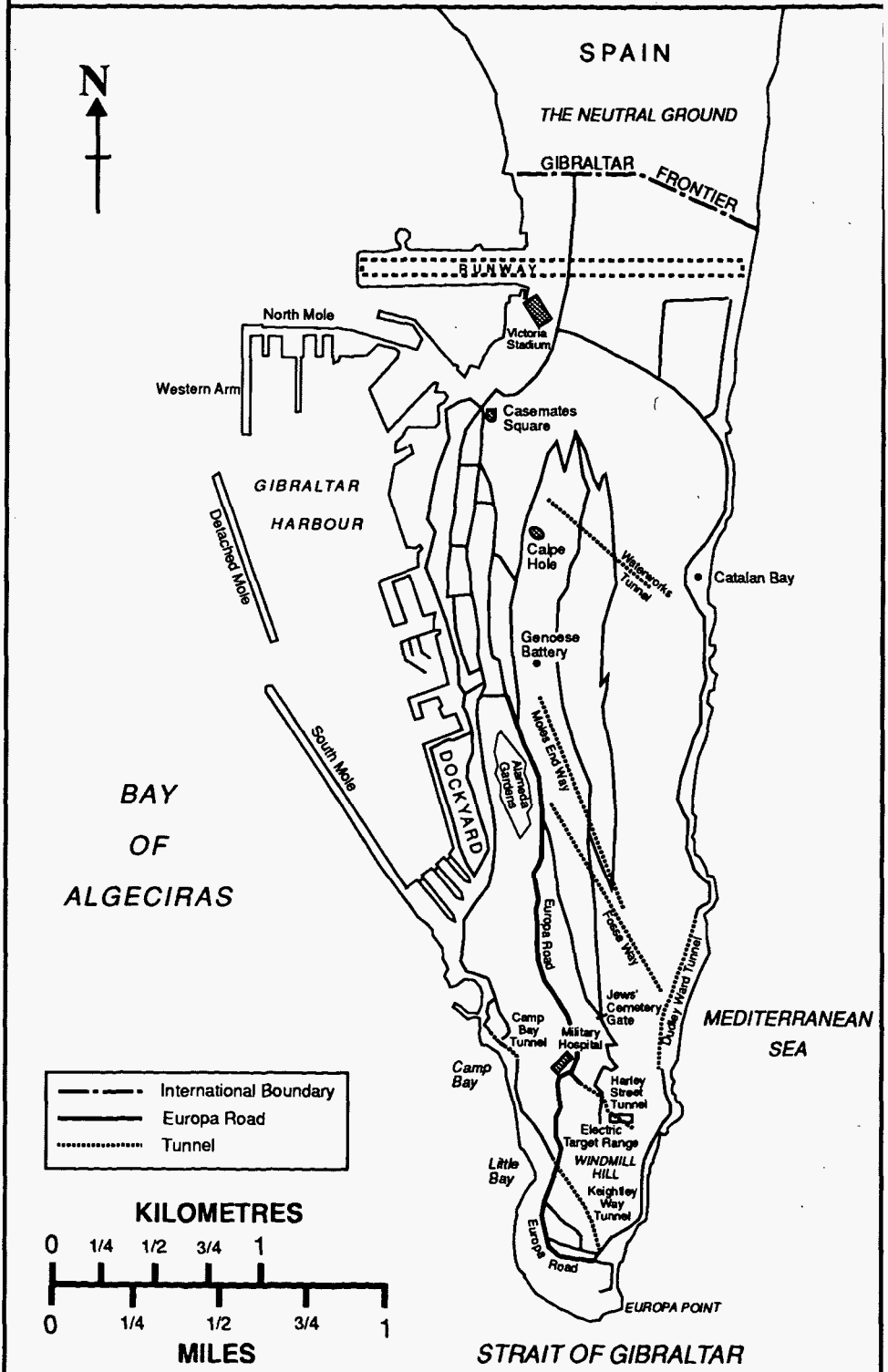
At the outset of this period the main commitments for the Royal Engineers were the operation and maintenance of the power stations at Calpe Hole and Windmill Hill, and their associated high voltage distribution systems, and tunnelling arising from the birth of the new military town at the southern tip of the peninsula known as Europa. They also provided operational support for the resident garrison infantry battalion; for example while 32 Construction Squadron was still in Gibraltar a troop accompanied the Prince of Wales Own Regiment of Yorkshire on exercise in Libya.

Electricity Generation

The power station at Calpe Hole had been commissioned in 1955 to meet the increasing demand for electricity from all three Services. It was a completely subterranean station, in a site originally excavated in 1943 as a ration store, housing three diesel engine driven 1000 kilowatt generators and one gas turbine driven 850 kilowatt set; in addition to meeting the operational need it thus also provided excellent training facilities.

The station on Windmill Hill, which contained six English Electric 300 kilowatt sets, had been built as a standby reserve to Calpe Hole. By the end of 1964 however, with reduction in demand due to the construction of an inter services generating station in the Dockyard, its usefulness had diminished and in 1966 the generators were dismantled and backloaded to the United Kingdom. Six years later, in March 1972, Calpe Hole was relegated to being an unmanned switching station.

GIBRALTAR 1980 — MAP 16



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Tunnelling

In the late 1950s plans were made for the construction of a new military town at the south end of the Rock. The plan envisaged the construction of new barracks, married quarters, a drill square and other installations on a scale sufficient to enable the garrison to concentrate in one place, so leaving the town of Gibraltar free for civilian accommodation. At that time, however, the only practicable route between Gibraltar Town and Europa, where the military town was to be built, was along the Europa Road - a narrow tortuous route with varying gradients and many constrictions. The new scheme made the provision of a better means of communication between Gibraltar and Europa essential and a pair of tunnels driven through the high ground between these two places was planned. Advantages incidental to the main purposes of these tunnels were that they would provide a route for the contractors lorries during the construction of the town and they would open up an attractive, but previously almost inaccessible area at Little Bay.

It was decided at the outset that the tunnels should be 26 feet wide to provide easy passing for 3-ton trucks. This in itself was an innovation in Gibraltar where all previously driven vehicular tunnels were only 12-14 feet wide and relied on passing places to maintain the flow of traffic. This large size combined with a rather awkward gradient in one of the tunnels presented some problems.

Having just completed the enlargement to 12 feet square of a wartime 1000 feet long link, known as the Harley Street Tunnel, between the Military Hospital and the East Coast, the Tunnelling Troop began work on the longer of the two tunnels from Little Bay to Europa Flats in April 1960. The final blasting was completed on 30 November 1962, the 1300 feet long tunnel having been ceremonially named as Keightley's Way by HE the Governor on 15 June.

Meanwhile work had begun on the second tunnel from Camp Bay to Lower North Gorge. Break-in started on 5 March and, after considerable difficulty through badly faulted rock, the pilot tunnel was completed on 11 September 1962. Slashing to final size was started in February 1963 but had to be discontinued in April because of the rock conditions until reinforced concrete linings were available. An additional two way tunnel linking Catalan Bay on the East coast to Europa was

started in 1963 to provide a dual carriageway route known as Dudley Ward Way. It was completed in 1965.

The Harley Street project consisted of driving a 145 feet by 6 feet square vertical service shaft from Harley Street tunnel to the New Barracks on Windmill Hill. This type of work had not been attempted in Gibraltar before and provoked considerable interest when it began in 1963. It was completed successfully and handed over to MPBW in 1964.

The last tunnel to be built by Sappers in this period was the 3690 foot long Moles End Way, started in November 1965, broken out and named in September 1967, and completed in March 1968. It was a single carriageway (11 feet by 11 feet) tunnel connecting the dockyard Ragged Staff Magazines with those on the East Coast of Fossway and thus providing a secure single vehicle access to avoid vehicles having to use the Coast road. Over the years the RE Tunnellers had acquired the nickname "Moles" and their final task on the Rock of Gibraltar was aptly called after them. On 1 April 1968 the Moles ceased to exist and tunnelling as a Sapper trade disappeared, some 186 years after their progenitor Sergeant-Major Ince had started to excavate the Upper Galleries. Thereafter all such work became a MPBW responsibility.

Military Aid to the Civil Community

In 1956 Spain renewed her claim to Gibraltar at the General Assembly of the United Nations; initially she obtained little support but she persevered. In 1966 she closed her frontier and no more Gibraltarians were allowed to enter Spain. The ferry service connecting Gibraltar with Algeciras was stopped and all telephone communications with the mainland were severed. Spanish labour, which daily entered Gibraltar and on which the Naval Dockyard and many civilian activities so heavily depended, could no longer come in to work. Gibraltar was thus in fact once more in a state of siege.

To ease the situation, from 1969 onwards Sapper units were sent to Gibraltar on short unaccompanied tours both to increase operational support for the resident infantry battalion and to carry out projects that would assist in the development of tourism and provide amenities for the cooped-up Gibraltarians. Over the next four years works completed in the latter category included the beautification of old gun batteries, the construction of car parks and lay-bys on the Upper Rock, and promenades

and bathing beaches by the sea shore. 60 Field Squadron, during their tour in 1969, constructed a promenade at Catalan Bay and another 90 yards long on three levels with interconnecting stairs and access to the sea. The site was very inaccessible and the construction included a large retaining wall. The new promenade increased by one third the capacity of the most popular beach in Gibraltar. The squadron also landscaped the site of the old Batteries at Jews Cemetery Gate and Genoese Battery which were eyesores above the town, and generally inaccessible to the public. The Battery at Jews Cemetery was converted into a large car park and a lookout with magnificent views across the straits and bay. Genoese Battery overlooking the town was converted to a very pleasant lookout and picnic spot and included the construction of a path and steps down a steep hillside.

Similar tasks were carried out by their successors 20 Field Squadron who were deployed to Gibraltar from October 1969 to June 1970 and who contributed a promenade at Camp Bay, a car disposal shute, a reinforced concrete bridge to provide access to a car park at Zoca Flank and a water main and fire hydrant on the Upper Rock.

50 Field Squadron relieved 20 Squadron in June and their main preoccupation was the construction of the Victoria Stadium, a major project which they successfully completed by the time they were replaced by 10 Field Squadron in January 1971. A further promenade, at Europa point, was built by this unit together with a host of minor projects including the realignment of the Electric Target Range. Thereafter the Royal Engineer support from the United Kingdom was reduced to a field troop and their main task was the construction of a new road bypassing the Europa quarter complex, incorporating an underpass, a reinforced concrete bridge and a roundabout. In conjunction with 1 Fortress Squadron and a section from the Royal Pioneer Corps the road was completed including all markings, road signs, safety barriers and electrical work by Service personnel.

In February 1973 the Fortress Squadron was reorganized to include a field troop, and the commitment for a roulement troop to be provided from the United Kingdom therefore ceased. From time to time however units still continued to be deployed to the Rock. In 1973 it was the turn of the STsRE: 501 STRE (Bulk Petroleum)(V) replaced 300 feet of badly corroded oil pipeline,

504 STRE (Power Station)(V) temporarily reactivated Calpe Hole, and 525 STRE (Construction)(V) prepared the landscape design for future improvement to the Europa promenade. In July 1975 52 Field Squadron (Airfields) were deployed for three months during which time they installed 21 mobile homes for use as married quarters, converted a school and miniature range to the same purpose and resurfaced four large sports pitches.

Emergency Tasks

Fresh water was always in short supply on the overcrowded Rock, and was supplemented by a salt water supply wherever possible. From time to time emergencies arose either because rainfall was insufficient, or because it was too great for the storage capacity of the reservoirs (resulting in flooding and damage), or because of the corrosive effects of the salt water supply on the pumping equipment. As ever, Royal Engineer units were called out to cope on many occasions.

In March 1975, after a night of very high winds, the squadron assisted in the clearance of 2,000 sheets of corrugated iron used as water catchments that had been spread down a hill and were blocking a road. During the evening of 10 December 1975 heavy rains fell on the water catchments. One of the reservoir run-offs became blocked and the water overflowed the channel and ran down the hill side, bringing with it sand and rock which was deposited on the road above the Both Worlds Hotel. The retaining wall was in danger of being overloaded and 1 Fortress Squadron's Plant and MT was deployed that night to remove 250 tons of debris. The road was open again by 0400 hrs 11 December 1975, and the retaining wall saved.

In 1977 the squadron was involved in a longer task when it assisted the Public Works Department in the removal of rock from a major fall in the Catalan Bay area from April until September. The fall crushed and enveloped a PWD explosives magazine and thus created a very hazardous situation. 8,000 ICI safety fuze detonators and some other items were accessible, and were removed by hand; but it was established that there were a further 7,000 detonators remaining in the magazine. Some of these were lying loose on the ground, mixed into the fallen rock and collapsed magazine roof, and could be seen to be in an extremely dangerous condition. Owing to the danger of further rock-falls, explosives could not be used. It was decided to

fill what remained of the magazine with concrete, encasing all explosive material. The detonators previously removed by hand were encased in concrete in ammunition boxes and dumped at sea.

Bicentenary and Freedom Ceremonies

On 18 November 1971 in the House of Assembly a motion to grant the Honorary Freedom of Gibraltar to the Corps of Royal Engineers, as a sign of gratitude and friendship, was proposed by the Chief Minister the Honourable Major Robert Peliza and seconded by the Leader of the Opposition the Honourable Sir Joshua Hassan and carried unanimously. It was agreed that the Deed of Grant would be conferred on 6 March 1972 - the bicentenary of the raising of a Company of Soldier Artificers in Gibraltar.

A party of Sappers who had served on, or had been closely connected with the Rock flew out to Gibraltar to attend the bicentenary celebrations. For the conferment of the Freedom the Chief Royal Engineer, General Sir Charles Jones, and the Engineer-in-Chief, Major General F G Caldwell represented the Corps, and Brigadier J H S Lacey and Captain L Thomas represented the Institution of Royal Engineers and the Royal Engineers Association.

Monday 6 March 1972 was Freedom Day, and in the morning the Chief Royal Engineer unveiled a commemorative plaque at new gates to the Alameda Gardens just below the statue of General Eliott, the Governor of Gibraltar during the Great Siege. The gates were a gift from the Corps to the people of Gibraltar. The metal work of the gates and the Arms of Gibraltar and the RE badge affixed to them had been made by Royal Engineers in Britain and shipped out to Gibraltar. The stone pillars on which the gates were hung were built by a troop from 60 Field Squadron serving temporarily on the Rock and incorporated two pieces of stonework by Mr Anes.

The official presentation of the Freedom took place during the afternoon on Casemates Square where for many years the historic Ceremony of the Keys used regularly to take place. The massive doors of the Landport gates, once the only land entrance to the Fortress, were locked at sun down and the heavy keys were escorted through the Main Street of the City by an armed guard and delivered on a velvet cushion to the Governor for safe keeping overnight.

MALTA

Introduction

Diminutive though she may appear to be on the Mediterranean map, Malta has over the years exerted an influence on the international scene out of all proportion to her size. In recent history she played an outstanding part in the Allied cause against Germany in World War Two[2], for which she was awarded the George Cross, and as long as sea power in the central Mediterranean remained important to Britain the island provided her with a major military and naval base.

RE Organization

Until 1962, the Sapper element on the island consisted of a CRE (Works) and the Malta Fortress Squadron, the latter consisting of a field troop, a tunnelling troop and an E&M troop. With the handing over of works services to the MPBW in that year, the CRE's post was redesignated CRE Malta and Libya, responsibility for the area in North Africa having been assumed on the disbandment of Near East Command in July. On 14 October the following year an additional unit was formed, the Malta Park Squadron (later to become 72 (Malta) Support Squadron), and the fortress squadron was reorganized. The new unit consisted of a troop responsible for bomb disposal and training, another for plant and transport, and a third for workshops and stores. It also took over the commitment of providing plant sections in Tripoli and Benghazi. But throughout the Sixties the strategic value of the island was being steadily reduced, until in 1967 a Defence White Paper announced that all British troops would be withdrawn over the next few years. A high proportion of the population had hitherto been employed, directly or indirectly, in support of the British presence and much concern was voiced in both countries at the effects withdrawal would have. Thus, a joint mission, chaired by Lord Robens, reported the same year that 15,000 new jobs would need to be created on the island by 1972 to compensate for these losses.

As time went on it also became apparent that some further military commitment might, after all, be desirable to counter the increasing rise of Soviet sea power in the area. It was therefore agreed that while the Malta Fortress Squadron and Park Squadron would disband in 1970 there would be many ways in which the Corps could remain behind to help the islanders

broaden their economic base. 524 Specialist Team was duly established in 1968 to help the PWD, initially for a period of two years. In May 1969 the Malta government asked for the duration to be extended beyond April 1970 and in May 1970 a two year extension was agreed. There was, however, a change of government in Malta in June 1971 and one of the earliest acts of the new administration was to revoke the agreement. The Specialist Team, therefore, returned to Chatham in March 1972 but did not disband, pending a decision on its future. This proved to be a wise precaution as the new government shortly afterwards reversed its view and formally requested that the team return, which it duly did, more appropriately named Specialist Team RE (Malta), at the end of the same year. Thereafter it remained, in support of various public works organizations, until its final withdrawal in 1977.

Training and Operations

Even at the start of this period the resident squadrons were heavily committed to works support, but the handing over of these responsibilities in 1962 to MPBW enabled them to spend more time on exercises in North Africa in support of other arms units. They were also involved in construction projects in North Africa and Cyprus. Examples were works on the Akrotiri Mole and Malta Road in Cyprus and building the tank park and many huts and sheds at El Adem airfield in Libya.

In 1967 the island was honoured by a visit from HM The Queen and Prince Philip and their programme included a Military Tattoo, for which a castle background was built by the Sappers. Around this period they also completed many tasks for the local authorities, ranging from providing tractors and tippers to clear sea-weed from the beaches of St Georges Bay, the removal of 30,000 tons of silt from reservoirs at Ghasri on the island of Gozo and the construction of playing fields at Tal Handaq. Once the rundown had been confirmed many of the sappers who were locally enlisted were given resettlement training on tasks which varied from making and installing playground equipment and the redecoration of convent schools, completing electrical and plumbing installations for a new school for 50 boys and projects to improve the beaches at Sliema and Qalet Marku. As a constant reminder of the bombardment to which Malta had been subjected in World War Two, there were periodic finds of unexploded ordnance which kept the troop

responsible fully employed on numerous tasks ranging from the disposal of 500 kilogram German bombs to searching for individual rounds of rifle ammunition.

The final major task for RE Malta, appropriately called Ex Last Fling, was flood relief in Tunisia. Following torrential rains in the autumn of 1969 Tunisia was left with 550 people and one million cattle dead, 300,000 homeless and £25 million worth of damage. Sappers were deployed from Malta to Gammouda, 200 miles south of Tunis in the Gafsa region in January 1970 and were followed by assault pioneers of 1 Battalion Devon and Dorset Regiment placed under command in April. Their task was to clear 42 wells that had been silted up (varying in size from 10 to 20 feet in diameter and 15 to 30 feet deep) and repair 34 pumps and motors. To protect the town of Gammouda from future flooding a damaged barrage (1100 feet long, 12 feet high and nine feet wide), originally built by the French in the 1930s, was repaired. This work consumed 192,000 square feet of steel mesh and 8,000 cubic yards of rock (won from a purposely opened quarry 11 miles from site) to produce 4,000 gabions and was completed on 29 April 1970. Thus came to an end the colonial era of RE Malta, begun in 1798 when a Captain William Gordon RE landed to help the local irregulars against the French and unbroken thereafter until October 1970 when the last squadron was disbanded, leaving behind a Postal Unit and the new STRE as the only wearers of the capbadge on the island.

Specialist Team Projects

As has been mentioned already, a specialist team, initially numbered 524, was deployed in Malta on 1 May 1968 to work on construction projects for the island's government. During its first tour between 1968 and its return to England in 1972, the team were employed on a number of tasks including a 15 mile Panoramic Road on the south west coast, a by-pass at Hamrun and a new industrial estate at Marsa. These were later to be joined by further estates at Bulebel and Zejtun.

Malta had always maintained a labour intensive tradition, defying the use of machines in preference to manual work whenever possible. The Panoramic Road therefore became a long term venture but, with few comparable roads elsewhere on the island, it was felt a well aligned, soundly built highway would be welcomed by tourists and provide a stylish access to an attractive coastline. The bypass formed part of a regional

MALTA AND GOZO 1977
MAP 17
MILES
0 1 2 3 4
0 1 2 3 4 5 6
KILOMETRES
N
Panoramic Road
Road
Built-up Areas
GOZO
Gharb
Zebbug
Marsalforn
Ghasri
Xaghra
VICTORIA
Kercem
Nadur
Qala
Xewkija
Mgarr
MEDITERRANEAN SEA
MEDITERRANEAN SEA
Mellieha
St Paul's Bay
San Pawl il-Bahar
Qalet Marku
Ghajn Tuffieha
Gharghur
St George's Bay
SLIEMA
Naxxar
Bingemma Fort
Mosta
BIRKIRKARA
VALLETTA
Grand Harbour
MALTA
Attard
HAMRUN
Vittoriosa
Cospicua
RABAT
Qormi
Zabbar
Zebbug
Marsa
Marsaskala
Tal Handaq
Tarxien
Dingli
Siggiewi
Luqa Airport
Luqa
Bulebel
Zejtun
Qrendi
Zurrieq
Marsaxlokk
Birzebbuga
CORSICA (FRANCE)
ITALY
SARDINIA (ITALY)
TYRRHENIAN SEA
SICILY (ITALY)
IONIAN SEA
TUNISIA
MALTA AND GOZO
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ROYAL ENGINEER DEPLOYMENT IN NORTHERN IRELAND 1972 — MAP 18

Protected observation post in Ardoyne

Check point under construction

Button-on fence and anti-rocket screens being erected at a Security Force base

Armoured tractor removing a suspect vehicle

NORTHERN IRELAND

Accommodation block at Forkill nearing completion. *(Courtesy Lt Col J M Bickford)*

Border road closure using concrete filled Braithwaite tanks

NORTHERN IRELAND

Rapid Assembly Protective Walls in position

Allis Chalmers 645 Medium Wheeled Tractor backfilling a damaged airfield taxiway

BAOR Airfield Damage Repair exercise

Allis Chalmers & BAOR Airfield Damage Repair exercise

complex skirting the urban jumbles of Marsa, Hamrun, Valletta and Sliema, and consisted of nearly a mile of dual carriageway with an eleven span reinforced concrete flyover. The work at Marsa included supervision of the construction by contractors of eight factories which it was hoped would eventually provide employment as recommended by the Robens report. This task proved to be an eye-opener to local building standards for the team over the next two years, but the work was completed and the buildings available for use shortly after the team's withdrawal.

A similar but larger project, that at the Bulebel industrial estate, for which the STRE undertook full supervision responsibility on 1 April 1969, was of a very different calibre. This, too, was aimed at providing 43 factories for employment in the manufacturing industry, together with associated offices, roads and services, and was the largest single public works project to be executed at the time. But the concept, design and construction, carried out by four major contractors, were all of a very high standard and resulted in an attractive and soundly built estate. Various other projects were tackled at this time including meeting frequent demands for hydrographic surveys, and from time to time specialists, including teams from the Reserve Army, visited the island for their annual training, thereby providing assistance.

As part of the general military withdrawal in 1972 the team ceased work on 13 March and left the island soon after. However, as early as 12 April the High Commission were formally requested to seek the return of the STRE as the Malta Government were urgently needing advice and assistance, particularly in harbour design, maintenance and repairs. Appropriate negotiations were speedily completed and agreement was reached in September, the team's advance party arriving at the end of October. By the end of the year as already recorded the team, enlarged and renamed STRE (Malta) was back in business.

One of their earliest tasks was in fact to resume responsibility for the Zejtun housing estate which on completion amounted to 140 houses and about the same number of other buildings, including shops, flats and garages[3]. Other similar schemes were prepared by the team at Birzebbuga and Qormi and construction under contract was supervised by them. But the major project for which they were responsible was the

construction of Laboratory Wharf in Grand Harbour, not in itself a particularly unusual task from the engineering point of view, but one which typified the difficulties under which the team were working.

The original wharf had been a mass concrete and masonry structure used by the Royal Navy which had been badly damaged by bombing during the war and which took its name from an underground ammunition laboratory in the vicinity. Its refurbishment, by building a new concrete gravity wall 15 feet or so in front of the previous one thus utilising deeper water, became necessary because adjacent berths would otherwise no longer be usable once a prestigious new dry dock, being built and financed entirely by Communist China, was in operation. The PWD began the construction early in 1972 but from mid 1973 the STRE became responsible for all design, planning and site supervison. Many frustrations were encountered, including long delays in getting firm decisions on fundamental matters such as the final levels, whether or not a travelling crane was to be included, and what spares for construction plant could be purchased. There was also a chronic shortage of materials, plant, labour and foremen. Nevertheless the 725 foot quay which consumed huge quantities of underwater concrete - over a thousand cubic yards were poured on one record day - was completed in 1977, and prior to the team's departure two further wharves were built and designs and contract documents prepared for the associated terminal buildings - though there was little likelihood that they would be implemented for several years at least. The same reluctance to proceed overshadowed several other reports produced by the team covering repairs to the Grand Harbour breakwaters for which various hydrographic surveys had been carried out.

Meanwhile many of the local hospitals had been allowed to get into a poor state of maintenance and the government had announced an eight year improvement plan. At the outset the hospital buildings were maintained by the PWD while their electrical and mechanical content was the responsibility of Malta Drydocks. It was mainly this latter aspect in which the STRE were involved from 1973 onwards, providing a consultancy service for the improvement of these services. As an example, when the team first became involved at St Luke's, the only general hospital on the island, the operating theatres were old

fashioned, lacked air conditioning and any piped medical gases; there were neither intensive care units nor any pediatric or geriatric facilities. The steam boilers were unreliable, the mains corroded and the water treatment plant broken down. By the time they left, the team could claim to have had a major part in the complete modernization of the theatres and boilerhouse, the replacement of the water mains and treatment plant, and the services in brand new intensive care and hydrotherapy units. The most prominent feature was the design and supervision of construction of a 150 feet high reinforced concrete chimney at St Luke's which is visible from much of the island today. They also carried out similar improvements to a number of other hospitals and units on the island.

STRE (Malta) was never intended to be permanently established so its eventual demise was inevitable. It had originally been deployed at the end of 1972 for a period of four years, subject to review after the first two years. By August 1975 it was apparent that possible tasks for which the team might be redeployed elsewhere in the world were now unlikely to materialize and in July 1976 an extension to stay until November 1977 was duly agreed between the two governments. By the time technical responsibility for all works was handed over on 28 October, the team had been responsible for the design and supervision of some three and a half million pounds (Maltese) worth of works and much additional design and consultation. Its members had gained much technical and professional experience in an area where acceptable engineering standards were generally low, official policy was to improvise wherever possible, and lack of foreign exchange meant tight financial contol. By reason of its very isolation it was able to work as a complete, independent unit on a wide range of tasks without the constraints of external conflicting military demands.

The team's last act before its return to England to face dispersal and disbandment was to hold a farewell cocktail party in the magnificent Verdala Castle near Rabat, designed (appropriately) in the sixteenth century as a fortified medieval keep and surrounded by a moat. Two hundred and fifty guests attended, including the President of Malta who was presented with one of the RE mess plates by the Chief Royal Engineer, Lieut General Sir David Willison.

LIBYA

After World War Two, Cyrenaica and Tripoli were administered by Great Britain until their formation into the single kingdom of Libya in 1951. Relations remained cordial and were formalized by a treaty signed in 1953 which provided Britain with the use of a major air base at El Adem, the stationing of a garrison in the country and the use of extensive areas in Cyrenaica for training. It had originally been intended that an armoured division would be based in Libya as a theatre strategic reserve but its value was severely restricted by a clause in the treaty which precluded the use of any troops stationed there against any country with whom Libya had friendly relations. This restriction was amply demonstrated during the Suez operation in 1956 when virtually none of the United Kingdom contingent could be drawn from Libya to take part. The value therefore of the country as a base was reduced considerably thereafter, until by 1960 there was but one battalion in Tripoli with a rifle company detached in Tobruk. There were no Sapper units permanently deployed there, other than plant sections in Tripoli and Benghazi from the Cyprus Plant Troop, and the remaining works services were wholly civilian. However, Cyrenaica was used frequently for training by units in Malta, Gibraltar and Cyprus and, on a larger scale, by 3 Division from the United Kingdom. In 1960 a major brigade exercise, Starlight, was mounted from England by 1 Guards Brigade with 23 Field Squadron in support and similarly Exercise Triplex West was carried out by 19 Brigade with 3 Field Squadron in 1963. On both occasions the units were airlifted into El Adem before onward deployment in the desert, leading to simulated assaults on Jebel Akhdar. Many adventure training exercises were also held for small parties from the strategic reserve, often mounted by 33 Field Squadron in Cyprus[4].

Until 1962 land forces in Libya came under command of HQ Near East Land Forces in Cyprus, but with its disbandment in July, Malta and Libya District was formed directly under War Office control. For the next few years exercises continued in the area[5], though the remaining troops in Tripolitania were withdrawn in 1967, until on 1 September 1969 King Idris was overthrown by a military coup and the treaty was abrogated. By the end of March 1970 all remaining British troops had been evacuated.

FOOTNOTES TO CHAPTER VIII

1. Named after Major M D King. OC Cyprus Support Squadron at the time.
2. See Volume VIII.
3. In appreciation of the team's efforts one of the contractors arranged for an RE grenade and the appropriate dates to be carved in a prominent position on a wall in the estate.
4. One of the officers of 33 Independent Field Squadron was Lieutenant John Blashford-Snell who took ample opportunity through these exercises to develop the skills and taste for adventure that led him eventually to found the Operation Raleigh organization which benefited so many young people in the 1980s and 1990s.
5. A major Sapper exercise took place in 1963 in which 33 Squadron crossed the desert from Tobruk to Agedabia. Their adventures included vehicle casualties in old World War Two minefields, the building of a Beverley strip near Agedabia and the loss at sea of a Heavy Ferry which broke loose from the LST which was towing it. Happily there was no loss of life.

CHAPTER IX

NORTHERN IRELAND

POLITICAL BACKGROUND - 1969 THE ONSET OF VIOLENCE - The Rioting Starts - Royal Engineer Deployment - Barricades - The Belfast Peace Line - Accommodation - 1970 THE BORDER IS CLOSED - Formation of the UDR - Formation of the PIRA - Border Closure - 1971 INTERNMENT - Long Kesh - Magilligan Internment Camp - Operation Ashburton - Deployment - Royal Engineers in the infantry role - 1972 THE PEAK OF VIOLENCE - Bloody Sunday - Ceasefires - Operation Motorman - 1973-74 THE CHANGING THREAT - Operation Despite - Deployment - General Strike - Living and Working Conditions - 1975 SECTARIAN VIOLENCE - Training - 1976 - 80 THE LONG WAR - Mortars - Crossmaglen - Belcoo Bridge - Strikes and Marches -The Queen's Visit - Forkill - THE INFANTRY ROLE - SEARCH - SURVEY - TAILPIECE

POLITICAL BACKGROUND

The history of Ireland is full of conflict and much of this has passed into myth and legend. The culmination of the tide of Irish Nationalism was the Easter rising of 1916 which was ruthlessly suppressed by the British Garrison. Sinn Fein (Ourselves Alone) which at the start of the 20th Century had as its aim an elected Irish Parliament in Dublin, moved on to look for an Independent Irish Republic. The military arm of Sinn Fein was by 1920 waging a guerilla war against the Royal Irish Constabulary which continued for the next two years. On 6 December 1921 an Anglo Irish Treaty was signed which was to give 26 counties the constitutional status of a dominion, as the Irish Free State. The six remaining counties were given the option to join the Free State which they declined, and the province of Northern Ireland now comprising Antrim, Armagh, Londonderry, Down, Fermanagh and Tyrone arose[1]. At the same time the polarization of the Catholic and Protestant communities became increasingly marked. The Catholics did not wish to join in with a government which they opposed and the Protestants appeared to contrive matters in such a way as to ensure that the Unionists remained in the ascendancy. The Catholic population also perceived widespread discrimination against themselves in

employment in both public and private sectors, and in education. Unemployment in all sectors of the community remained high and in the 1930s never fell below 25%. However during the war years and up to the mid 1950s there was a steady general improvement in the standard of living and even cooperation between North and South. In December 1956 the Irish Republican Army (IRA) launched a bombing campaign in the North, which provoked an immediate response both North and South with the internment of many of their key figures. By February 1962 the terrorists called off their campaign as many of their members were interned and they had not received widespread support among the Catholic population.

The mid 1960s saw the rise of the Civil Rights Movement in the USA which had its Northern Ireland copy. In 1967 the Northern Ireland Civil Rights Movement which drew its main strengths from the Catholics, both middle and working class, and from the students of Queen's University, took to marching on the streets. These early marches were broken up by the police and led to confrontation with the Protestant community. The Stormont Government's attempts to introduce reforms were seen by Protestant extremists as a betrayal of their position and led to a series of bomb attacks inspired by the irregular Ulster Volunteer Force on infrastructure targets.

1969 THE ONSET OF VIOLENCE

The rioting starts

The Apprentice Boys March in Londonderry on 12 August 1969 was attacked by a Catholic crowd and the Royal Ulster Constabulary (RUC), then a force of only 3,000 men was deployed to keep the peace.[2] In Londonderry the Catholic parts of the City were designated as the so called 'Free Derry'. There was also serious rioting in six other towns throughout the Province, and of such gravity that the Northern Ireland Government appealed for help. On 14 August 1st Battalion Prince of Wales Own Regiment was committed to the Bogside and on 15 August 2nd Battalion Queen's Regiment was deployed to establish a 'Peace Line' in Belfast between the Falls and the Shankill. Further reinforcement of the small Northern Ireland garrison rapidly followed and the widespread media coverage, particularly on TV, brought the issues before the

British public. The rapidly deteriorating situation led to an increase in the Army strength to 6,000 men by the autumn of 1969 with the arrival of additional battalions.

Royal Engineer Deployment

Prior to 1969 Northern Ireland affairs played little part in the activities of the Corps, and there were no Sapper units in the Province apart from 90 Engineer Park at Antrim with a regular staff of two, and 146 (Antrim Artillery) Engineer Regiment TA.

The first Sapper reinforcement occurred on 27 April 1969 when one troop of 34 Field Squadron was sent from England to construct watch towers, sentry posts and wire defences against the threat of attack on public utilities and government installations. They returned to the mainland on 3 July 1969 having completed their tasks. As the Army came onto the streets in the middle of August it became clear that Sappers were required and a reduced 3 Field Squadron was despatched from Tidworth on 17 August 1969, with only one field troop and support troop, and moved into the bridging camp at Antrim. The situation they found was that Londonderry was quiet although a number of houses and a factory had been burnt down, with the Bogside and Creggan barricaded off from the rest of the City as 'Free Derry' by some thirty barricades made of rubbish and paving stones. Neither the RUC nor the Army were in this predominantly Catholic area. In Belfast many houses, shops, pubs and factories had been burnt out, rubble was spread across many roads and some buildings were still burning due to gas leaks. Many other buildings had been damaged and looted, parts of the City were cut off as there were some 300 barricades, many of them on the main routes. There was overall a high feeling of tension and the slightest incident was likely to trigger a fresh outbreak of violence.

The general expectation was that the troubles would, as in the past, be short lived. There was a political reluctance to commit more troops, indeed the reinforcement plans only took account of a limited infantry reinforcement and these expectations delayed the establishment of additional headquarters staff to cope with the emergency. An 'ad hoc' Royal Engineer Headquarters was established at Headquarters Northern Ireland where Lieut Colonel J F Inglefield-Watson, the Commanding Officer of 74 Engineer Regiment (Volunteers) acted as CRE part-time. Major D O Caton was the only resident RE officer in

the headquarters and he was joined by Major J A McK Holloway and Captain M P Tebbut on emergency tours.

It had been considered that the closure of the border would ease the security situation and the permanent staff of 74 Engineer Regiment (V) had undertaken reconnaissances of all border crossing points. During August and September 1969 3 Field Squadron undertook further checks on these border crossing points and also provided operational support to 39 Infantry Brigade in Belfast. The work included the removal of barricades, erection and maintenance of defence works in various military headquarters and RUC stations, the construction of helipads on roof-tops, the erection of barriers and the demolition and clearance of damaged and gutted buildings many of which were dangerous. The squadron was overstretched as men were working for up to 16 hours a day for seven days a week. As it was also expected that a large hutting programme would be required, an extra field troop was requested, and this was provided from 34 Field Squadron and came under command on 12 September 1969. Nevertheless, despite the volume of engineer works involved it was not until September 1970 that a full time CRE was established with the arrival of Lieut Colonel J F M Grear with a Garrison Engineer and Clerk of Works on his staff.

Barricades

The widespread use of barricades posed many problems for the Security Forces. Initially they had been erected mainly by the Catholics to prevent attacks into their areas, while in Protestant areas barricades were used as rallying points for attacks and also as screens behind which rioters could retire when the police and Army intervened. In the areas where there were such obstacles the local population elected their own defence committees, who in turn appointed vigilantes to maintain round the clock guards to prevent their removal. The large number of barricades in Belfast and Londonderry were normally sited at road junctions and provided an effective block right across the street, except for a small walk way on one side to allow pedestrian access. The standard of construction was excellent considering that they were hand built of local material, usually paving stones taken from nearby pavements. The simple barrier was supplemented by cars, double decker buses, lorries, trailers, rubble, furniture and steel formwork bolted onto scaffolding. The Army policy

was to persuade the local defence committees that the barricades should come down, and this required careful patient negotiations by each unit. However by 15 September 1969 all the barricades in the Catholic areas had been removed, and this success resulted in a good relationship between the Army and the Catholic Community which lasted into 1970.

The Belfast Peace Line

The infantry were initially deployed between the Protestant Community in the Shankill and the Catholics in the Falls areas, and it was soon decided that a Peace Line should be constructed to provide a substantial barrier between the two communities and to help to reduce the commitment of soldiers. 3 Field Squadron was warned for the task, four hours before it was announced in the Stormont Parliament. The alignment had to be negotiated along every foot of its route and among those involved were the Deputy Director of Operations, Major General Dyball, local members of Parliament, priests, and representatives of the City Council supported on both sides by large vociferous crowds. 3 Field Squadron started work on 10 September 1969 in the full glare of publicity - some 15 television teams were watching - and by 15 September they had completed 20 of the total of 22 fences. It had initially been proposed to use a barbed wire fence, with the pickets concreted into the road surface but in many places a stronger construction was required, such as a double corrugated iron fence, 9 feet high, on steel supports with the space between filled with rubble. Considerable discussion and prevarication resulted in some of the fences being moved and others strengthened, but despite these delays and rioting and destruction in Coates Street on 28 September, the line was completed on 1 October 1969. Watch towers were subsequently erected along the Line to provide observation along its entire length and there was a considerable continuing maintenance commitment. All engineer stores were provided through 90 Engineer Park who issued 270 tonnes of defence stores and manufactured over 1,500 knife rests for all this work.

Accommodation

The number of reinforcements posed serious accommodation problems as the few barracks and weekend training centres

rapidly became full. The immediate solution particularly in the city areas was to requisition empty factories and other buildings. With winter approaching much of the temporary accommodation was inadequate and in September a plan was made to erect Twynham Hutting. This work was to be undertaken by the Ministry of Public Buildings and Works (MPBW) who had a stock of huts available in England, albeit the tropical version but fitted with standard temperate windows. By the time the unit deployments had been decided and accommodation plans completed by the staff, it became clear that if the huts were to be ready before the onset of winter, work must proceed rapidly. The work therefore had to be shared. Civilian contractors would carry out the concrete base construction, the installation of wiring, plumbing and partitions, whilst Royal Engineers would complete the remaining work including the actual erection of the huts. An MES officer, Captain R R Skipp and a Clerk of Works (Construction) were sent over from England to help MPBW carry out the work.

1970 THE BORDER IS CLOSED

The start of 1970 was a relatively quiet time before a fresh outbreak of violence in April. The overall force level had been raised from the pre 1969 garrison of HQ 39 Infantry Brigade and two battalions by the addition of five further battalions and a further brigade HQ responsible for the West of the Province. Initially this had been 24 Airportable Brigade which was replaced by 8 Brigade. There was also a change in the Sapper units when 3 Field Squadron returned to Tidworth in January 1970 to be replaced by 8 Field Squadron at full strength.

Formation of the UDR

In 1969 a commission headed by Lord Hunt had made recommendations concerning policing in the Province, one of which was that responsibility for the protection of the border in particular and the Province in general should pass from the RUC to the Army. A direct outcome was the formation of the Ulster Defence Regiment. The Act of Parliament which authorised the raising of the Regiment defined its tasks as supporting the regular forces in Northern Ireland should circumstances so

require, and protecting the border and State against armed attack and sabotage. The regiment formed on 1 April 1970 and immediately became operational.[3] At the outset seven battalions were raised, one for each county and the 7th for the City of Belfast, though subsequently four further battalions were embodied. The make-up of the regiment comprised both full-time and part-time members with a cadre of regular officers, warrant officers and senior NCOs from Regular British Army regiments including the Royal Engineers. The raising of the UDR caused additional work for 8 Field Squadron, who during their tour had to provide support for MPBW with the construction work and training facilities required by the new regiment.

Formation of the PIRA

From April 1970 the quiet period which had resulted from the strong military intervention of the previous year was broken. Rioting between Protestants and Catholics on the edge of the Ballymurphy Estate in Belfast resulted in 25 soldiers being injured and large quantities of tear gas being fired in response to the rioting. During the Protestant marching season of 1970, the time when the Loyalist community celebrated old victories over the Catholic population, parades were not banned by the Stormont Government, but were on occasions diverted, thus provoking the marchers and their supporters to riot and the Catholics to stone the marchers and the troops. On occasions during the marches gunmen opened fire under cover of the rioting.

1970 also saw the split of the IRA into two, the Official IRA - the Marxist wing which exploited social issues but did not intend being involved in the armed struggle, and the Provisionals (PIRA) - the Marxist Leninist Wing sympathetic to the unification of North and South. In July 1970 the Official IRA took on the Army and the area of the Falls was barricaded. Small arms fire was exchanged with Army units, tear gas was used and a curfew imposed from 3 to 5 July. During this time a major search was carried out and over 100 weapons, 20,000 rounds of ammunition, and incendiary devices and explosives found. Overall 337 people were detained, 5 civilians were killed, and there were 20 security force casualties. The Catholic community was alienated by these events and the number of activists in the PIRA grew rapidly from 100 in June 1970 to around 800 by the

end of the year with a concurrent increase in terrorism.

As cover for the marching season a further six major units and 8 Brigade Headquarters were sent to Northern Ireland. Units were provided with bases in their tactical area of responsibility from which their headquarters and sub-units could observe and operate and which would offer a firm administrative location. A wide variety of premises was used, including RUC stations, factories, bakeries, schools, halls and shops. All of this provided work for the Sappers, initially to make them secure by providing perimeter fencing and lighting, together with sentry posts, sangars and look out positions. The buildings had to be improved by bricking up windows and hardening doors and creating secure armouries. Work was carried out in conjunction with the Department of the Environment although in some places it was necessary to erect temporary structures ahead of their more permanent works. Sandbags were short lived, even when proofed, and it was found necessary to cover all but the most temporary construction with a skin of corrugated iron and there was always a high maintenance commitment. In July 1970 a subsidiary Peace Line was built in the Ardoyne area of Belfast to seal off the side streets giving access to the Crumlin Road. A rapid swoop by the whole of 9 Independent Parachute Squadron timed to begin after the local men had left for work, enabled the half mile of line to be completed in less than a day, and without opposition or argument as the local population did not have time to react.

In addition to support for operations there were numerous tasks which called for a range of Sapper skills and considerable ingenuity. The RAOC EOD teams frequently required engineer support, and there was a need for specialized search teams to look for arms and explosives, as the pressure on the terrorists led them to devise ever more ingenious hiding places. Plant was used to clear barricades and to lift derelict cars onto tipper trucks during such operations. There was also work involved in creating remotely controlled barriers at border crossings, installation of alarm systems at public utilities, the operation of searchlights, the laying of trackway and assistance with unloading landing craft across beaches.

Border Closure

The Border between North and South is about 300 miles long and in 1970 was crossed by 297 roads and tracks. Only 15 of

these roads were approved crossing places and a further 20 roads were permitted to be used as a concession to people living in the area. In general the border followed the old county boundaries, but it was poorly defined and frequently divided villages. Sometimes it ran down the middle of a road, cutting buildings and even in one case bisecting a church. Farmers often owned land on both sides of the border and needed to move their animals and machinery across without hindrance. The closure of the border would not only affect the pattern of life in the area but also seriously affect people's livelihood. The reconnaissances carried out by 3 Field Squadron in August 1969 had planned to use both cratering charges and metal spikes to close the roads, but it was later considered that cratering should not be used. In the summer of 1970 the decision was taken to enforce the closure and in August a start was made and 53 crossings were spiked using the Mark 1 system consisting of asymmetric tripods welded from 4¾ inch × 1¼ inch steel beams which were concreted into the road. It was not the policy to have standing guards on these barriers and the spikes were steadily removed by the local inhabitants who did not wish to undertake long detours to pass through approved crossings. The struggle with the local population to keep the crossings closed led to the development of a succession of systems: the Mark 2 system was made up of 40 gallon drums filled with concrete with steel tubes running through the centre, and extending five feet below the road surface; the Mark 3 system was made of 15 hundredweight concrete blocks, but even these were not substantial enough and in due course had to be modified to the Mark 4, where a steel wire strop was cast into the blocks and connected to a steel beam concreted into a trench across the road. As these crossings were not guarded and only visited by patrols the population brought up plant to assist with dismantling. As far as possible the Army tried to avoid confrontation, but could not prevent interference. In the event all this work was largely in vain because in October 1970 a political decision was taken to reopen the border.[4]

The engineer deployment at this time was one field squadron for a four month tour. The normal operational affiliation was to provide one field troop to each of the resident brigades: 8 Brigade based in Londonderry and responsible for the greater part of the Province and most of the border area, 39 Brigade based in Belfast and responsible for the City and the counties of

Down and Antrim. At times of extra commitment in 1970, both HQ 5 Brigade went to Belfast and HQ 16 Parachute Brigade to the South of the Province as short term reinforcements. As the infantry were under pressure other arms were deployed in this role. The first Royal Engineer unit to do so was 33 Field Squadron, which was placed under command of 42 Medium Regiment Royal Artillery from August to December 1970 in Londonderry.

The resources support for all these operations came from 90 Engineer Park, which was redesignated 325 Engineer Park on 6 May 1970. This unit originally had a staff of an OC and WO1 with the remainder being civilians, but it had to be reinforced by seven military to enable it to operate on a 24 hour basis. Apart from handling the large quantities of defence stores and building materials the Park undertook limited manufacturing tasks, with help from the field squadron, such as making knife rests, sign boards for road blocks and road spikes. Larger manufacturing tasks were undertaken at Long Marston by the Central Engineer Park who responded quickly to requests for a wide range of items, often in considerable quantity, including crash barriers, cow catchers for vehicles, signs, caltrop chains, sentry boxes and picquet huts. The normal holdings of plant and mechanical equipment in the Province were more than doubled to meet the enhanced workload.

1971 INTERNMENT

Early in 1971 the situation deteriorated as violence against the security forces increased. On 6 February the first soldier was killed and throughout February and March there were increasing numbers of casualties in the Army, RUC and the civilian population. The violence in these months led the Unionist Party to demand internment without trial, but this was not supported by the Army or the Westminster Government. The Northern Ireland Government asked for further troop reinforcements but only half of those asked for were provided, and the Northern Ireland Prime Minister resigned in protest. The PIRA bombing campaign began in earnest and the number of incidents escalated month by month: 16 in January, 37 in April, 47 in May, 50 in June, 68 in July, so that at the year's end the total

reached 1515. By this time the car bomb packed with explosives had been introduced with devastating results. As the year wore on it became apparent that PIRA were running a full scale guerilla war, striking indiscriminately and causing an increasing toll of death and destruction. Terrorists opened fire from fast moving cars and from behind screens of rioters or children. The police had lost control in many Catholic areas, and there was increasing difficulty in securing convictions as witnesses were intimidated by terrorists against giving evidence and even juries were threatened. The whole process of justice was endangered as it became extremely difficult to arrest and convict terrorists. Though detention and internment without trial had been used before both in the North and the South as a means of maintaining order, the Army and the Westminster Government still did not favour its use; but were persuaded by the Northern Ireland Government in the face of the massive increase in violence and on 9 August 1971 detention and internment under the Special Powers Act (Northern Ireland) was introduced.

Long Kesh

Whilst discussion of the possibility of internment was going on it became clear that a purpose built camp would be required to house the internees. 62 CRE (Construction) was tasked with the design of a camp to be built on a World War Two airfield at Long Kesh to house 450 male internees and a staff of 100. It was to be a fully equipped camp with electricity, water supply and main drainage: the initial requirement was for 27 Nissen Huts, 23 Twynham Huts and five permanent buildings, but this was subsequently increased by two Nissen Huts and seven sectional buildings. 48 Field Squadron moved to Northern Ireland on 29 June 1971 to work on the project, but as they had one troop away in the Gulf on an emergency tour, this was replaced by a troop from 51 Field Squadron (Airfields). A target date of 12 September 1971 had been set for the camp to be ready for occupation, though in the event the first 180 detainees who had been held on board HMS *Maidstone* and in Belfast gaol, moved in on 19 September. The first detainees were kept in barbed wire compounds and organized themselves as Prisoners of War. As they were unconvicted they had several privileges which were not available to convicted prisoners. Before the build was complete it became clear that further accommodation was required and an extension to the camp was designed by 62 CRE

and 64 CRE (E & M) to provide three more compounds to house a further 270 internees. This project (Operation Demetrius) was carried out by 53 Field Squadron (Airfields) between 28 November 1971 and 15 March 1972 involving the construction of five watchtowers and a further 12 Nissen Huts, four Twynhams, a standby generator building and the appropriate range of services. The first convicted prisoners came into Long Kesh in 1972 and it was then renamed Her Majesty's Prison Maze. Republicans were segregated from Loyalists and held in different compounds which they ran themselves with organized committees and engaged in military drills and lectures.

Magilligan Internment Camp

At this time 3 Field Squadron was operating in support of both 39 Brigade in Belfast and 8 Brigade in Londonderry, and internment brought the squadron some interesting tasks. In the early hours of 9 August a troop tunnelled through the granite wall which separated Crumlin Road Prison from Girdwood Park Barracks in order to provide a secure route for detainees to be taken into the prison without the risk of facing crowds at the main prison gate. Another troop was deployed to convert HMS *Maidstone*, a former submarine depot ship moored in Belfast Harbour, to accommodate detainees. The number of internees and the problems of their accommodation required urgent action to remove them from the unsatisfactory conditions on board HMS *Maidstone*. Magilligan Reserve Army/Cadet Force Camp was selected for conversion as it had much to commend it, having only one road leading to it and it was relatively remote in flat uninhabited surroundings with the sea on two sides. In early November, 30 Field Squadron was given the task of planning and executing the conversion with a target date of Christmas for completion. In view of the very limited time available improvization became the order of the day; perimeter fences were built of Sommerfeld tracking which was dog spiked to telegraph poles with the side locking bars welded to each track rod, and watchtowers 20 feet high were constructed of prefabricated Braithwaite tower sections with sangars on the platforms. Security areas with family visiting rooms and facilities were part of the project as well as conversion of huts into warders' accommodation and the 'Governors Residence'. A 100 kVA standby generator was installed and the Property Services Agency (PSA) completed the security lighting of the perimeter.

A Brigade escape study day was held inside the compound to devise ways of escaping and to test the systems. The most likely escape was considered to be a helicopter foray from County Donegal just across the River Foyle, so overhead wires were erected. The initial fear that escape was possible by tunnelling through the sandy soil was quickly dispelled as soon as the main fence supports were placed, when it was found that the water table was only 16 inches below the surface. All the prisoners' compounds were surrounded by 12 feet high corrugated iron sheeting so that the camp layout would not be seen. By Christmas the camp only lacked its main gates, which were being made by a Belfast contractor, and eventually arrived in early January. The first bewildered internees arrived by Wessex helicopter on 10 January 1972, and during its occupation not one succeeded in escaping from the camp. Later a very large complex, known locally as the Silver City, was built by the PSA about half a mile to the East, to which prisoners were transferred in 1973.

Internment brought bitter reaction in the Catholic ghetto areas in both Belfast and Londonderry. Barricades were rapidly erected with paving stones and reinforced by overturned and burnt out vehicles. Over the next two weeks battalions mounted operations first in Belfast and then in Londonderry in which plant and tipper teams of 3 Field Squadron worked to clear barricades and re-establish access. These operations frequently provoked hostile reaction and included attempts to defeat unarmoured wheeled tractors with wire obstacles and attacks on vehicles by petrol bombs and bullets. Corporal J Hamilton, a plant operator of 3 Field Squadron, was later awarded the Military Medal for one such action in which he killed a gunman from the cab of his Allis Chalmers MWT, although he was himself wounded in the incident.

Operation Ashburton

In September 1971 it was decided that access between the Republic and the Province should again be restricted by the closure of the numerous unapproved crossings and Operation Ashburton was mounted. As mining and booby traps were unacceptable the only closure methods which could be used were cratering, rooting and the erection of barriers. In the first week, 33 Field Squadron from Long Kesh, supported by a troop

of 9 Independent Parachute Squadron carried out the work. 8 Field Squadron were sent out direct from an exercise on Salisbury Plain in mid-October to assist with the work and stayed until the end of November. The tempo of the work was such that 75 roads were kept closed despite the attempts of the local population to reopen them. A troop of 11 Field Squadron was employed for some of the time and then the whole squadron took on the task. Helicopters were used a great deal to deploy Sappers and their protection parties and for the outloading of explosives from the Ammunition Depot at Ballykinler. However the road closures were of limited value as they were not in depth, nor were they closely guarded and so could be relatively easily by-passed, or filled in.

Deployment

It had long been apparent that one field squadron was inadequate to provide even the minimum level of engineer support required in the Province. In February 1971 a further field squadron was added to the force level initially at Long Kesh and subsequently at Castledillon, a former open prison. 20 Field Squadron was deployed on a four month roulement tour, to be replaced in June by 33 Field Squadron and they in their turn by 11 Field Squadron. Even this level of reinforcement was inadequate and in June 1971, 48 Field Squadron was deployed to Long Kesh. The demands on the United Kingdom based engineer units of 3 Division and 12 Engineer Brigade were such that the commitment soon had to be extended to BAOR. The need for a third field squadron to be based at the former RAF station at Shackleton Barracks, Ballykelly in support of 8 Brigade was established and 30 Field Squadron from Hohne, an APC squadron, moved in November to fill this role.

Royal Engineers in the infantry role

The overstretch was also applying to infantry battalions and as had occurred in 1970 other arms were deployed in the infantry role. 21 Engineer Regiment from Nienburg was deployed from April to August based at Long Kesh, initially under command of 16 Parachute Brigade and later of 19 Infantry Brigade. To make up the necessary strength, the regiment was reinforced by 5 Field Squadron from 26 Engineer Regiment and 42 Field Squadron from 35 Engineer Regiment. The regiment operated as brigade reserve, but was called in to support other units and

operations. The commitments were very varied and ranged from guards and manning of observation posts, to setting up road blocks, searching cars, houses and boats and seeking out terrorist rifle ranges. Memorable events for the soldiers of the regiment included their presence in Lurgan at a weekend when the Reverend Ian Paisley addressed a Protestant rally on a Saturday night, the stopping and searching of the Dublin to Belfast express train and a most notable weapons find in the garage of a farm near Lough Neagh when, using mine detectors and search dogs, a hoard of weapons and ammunition was discovered.

Many Royal Engineer activities throughout the Province attracted the attention of the gunmen. On one occasion a section of 50 Field Squadron came under fire while changing the tarpaulin on the roof of a damaged RUC station. Mercifully, though a large number of rounds were fired at the sappers there were no casualties. However one sapper was killed and one wounded, from the same unit, when two gunmen opened fire on a section who were building an elevated OP at Crossmaglen. An interesting task carried out by 30 Field Squadron between March and May was to build a communications relay base on Divis Mountain which towered above Belfast. Elephant shelters were erected by the squadron to house the radio equipment, and because of the inaccessibility of the site all the stores had to be flown in by Wessex helicopters. A road was subsequently constructed up the mountain by the Royal Engineers.

1972 THE PEAK OF VIOLENCE

1972 was the worst for bloodshed with the highest number of bombings and shootings and also the highest numbers of casualties; the Army, UDR and RUC suffered 146 members killed, and 223 civilians, together with 95 republican and three loyalist terrorists, also died. Overall this was a total almost twice that of any other year over the period with which we are concerned. At the start of the year there were 17 major units, including those from the Royal Marines and Royal Air Force Regiment, deployed in the infantry role, and as the violence reached its peak the number rose in the summer to a maximum of 27 major units.

Bloody Sunday

The major opening event of the year was the battle in Londonderry on 30 January 1972 which has gone down in history as 'Bloody Sunday'. An illegal march of some 3,000 people came out of the Bogside and Creggan areas and was contained by the Security Forces at a barrier in the area of Rossville Flats. Fire was opened on 1st Battalion Parachute Regiment, who were carrying out arrests, the fire was returned and by the end of the day, 13 civilians were dead. The consequences were serious. The Irish recalled their Ambassador in London, the British Embassy in Dublin was burnt down by a mob, and 'No Go' areas were established by the Catholic population in Londonderry and Belfast. Suggested political reforms for Northern Ireland put forward by the Government in London were rejected and devolved Government became unworkable. On 24 March direct rule was established and Mr William Whitelaw appointed as the first Secretary of State for Northern Ireland. In the aftermath it was hoped that the IRA might desist from its campaign of bombing and killing whereas in fact it was attempting to prove to the British Government that its members could strike with impunity and that the Province was ungovernable.

23 Engineer Regiment arrived on 22 March 1972 in the infantry role and took over from 1st Battalion Queens Own Highlanders in East Belfast. 12 and 16 Field Squadrons were deployed in the Catholic Ballymacarrett area and the immediately surrounding Protestant area. 37 Field Squadron's main task was to guard the detainees on HMS *Maidstone*, with the Regimental Echelon housed in two hangars at the Royal Navy Aviation Yard, Sydenham. At the introduction of direct rule, there was a certain amount of unrest among the detainees on HMS *Maidstone*, including a hunger strike; but the ship closed as a detention centre on 9 April when the detainees were moved to Long Kesh.

The Protestant reaction to direct rule did not take long to manifest itself. There were two car bombs which exploded in Castlereagh Street, one on 5 April and the second on 19 April, each estimated to contain 50 pounds of explosive which was large for those days. Fortunately there were only a few minor casualties but damage was extensive. At the end of April there were major riots in East Belfast with arson, looting, barricades being constructed and gunmen shooting on the streets.

Protestant militancy increased and on 20 May the Ulster Defence Association (UDA) set up a token 'No Go' area in Willowfield. 23 Engineer Regiment, reinforced by companies from 2nd Battalion The Parachute Regiment, 7 Regiment Royal Horse Artillery, 1st Battalion Royal Regiment of Fusiliers, 2nd Battalion Royal Green Jackets, took out the barricades, under fire from terrorists. The following weekend 27/28 May the UDA activity was dignified by the designation 'temporarily barred area as a political demonstration'. Barriers were again set up in Willowfield, and it was made clear to the demonstrators the circumstances under which the Army would intervene. Permission was given for the demonstration to be allowed for the specified period and the barriers were duly in position for a full 24 hours in a relatively well organized and disciplined display.

Ceasefires

On 29 May 1972 the Official IRA declared a ceasefire which held for the rest of the period. The Provisional IRA ordered a ceasefire on 26 June and Mr Whitelaw, the Secretary of State met PIRA leaders in London. This lull lasted to 9 July when the PIRA resumed hostilities. However the Loyalist paramilitaries did not keep the ceasefire: on 5 June a bomb exploded outside the Britannia, a well known Republican bar, injuring 50 people, and causing a great deal of damage which 23 Engineer Regiment was involved in clearing up. Over the period 11 - 14 June the UDA made further demonstrations and a large number of barriers were erected in Belfast. At these barriers there were many incidents which included arson, looting and petrol bombing, in response to which the Security Forces fired considerable numbers of baton rounds. While all of this was going on the Catholics, not to be outdone, also engaged in hijacking buses and burning vehicles.

Although the PIRA had announced a ceasefire on 26 June, there was an increase in violence up to the deadline, with nightly shootings and two minutes before the midnight deadline Staff Sergeant Banks was killed. He was in a landrover returning to his troop base when shots were fired from an alleyway and he was killed instantly. Sergeant Bailie, who was with him, suffered minor injuries when a flare in his pocket was hit by a bullet. The death of Staff Sergeant Banks who had taken a leading part in a community relations project, building a hut for mentally handicapped children from both communities, brought the

number of British Army personnel killed since the troubles started in 1969, to over 100.

As soon as the ceasefire ended on 9 July, the PIRA mounted a fresh wave of attacks on people and property. On Friday 21 July there were 19 bombs in Belfast, the targets including the bus and railway stations, ferry terminus, hotels, offices and shopping centres and the casualty figures were very high: 9 killed, 77 females and 53 males injured. On 31 July the village of Claudy was virtually wiped out by three car bombs, killing six people.

Operation Motorman

The low profile adopted by the Army in the early part of the year led to some concern that the Security Forces could no longer contain the situation. The terrorists had a significant grip on their own communities and the Protestants were becoming increasingly restive, expressing strong resentment against the 'No Go' areas in Belfast and in Londonderry. Prompted in part by these concerns a major Army operation was mounted on 31 July 1972 known as Operation Motorman, to reoccupy the 'No Go' areas. A total of 21,000 troops were concentrated in the Province and the intention was announced beforehand, as a result of which there was very little resistance from the PIRA. The operation was one of the biggest undertaken by the British Army since the invasion of Suez in 1956. Its aim was to re-establish the Army in all the hard Republican areas, particularly the Creggan and Bogside in Londonderry and the Andersonstown, Ballymurphy and the Markets areas of Belfast. These areas were well protected by barricades and their clearance was the first step to ensure freedom of movement. A troop of four Centurion AVREs from 26 Armoured Engineer Squadron in Germany was moved to England and embarked on HMS *Fearless* on 30 July 1972. H-hour for the operation was 0400 hours on 31 July and by H minus 2 a cordon was in place in Londonderry around the Bogside and the Creggan, securing the start line for the four battalions who were to occupy the area. The AVREs were landed from landing craft across the beach in Londonderry and led the assault to clear a way through the barricades on all four battalion routes. The barricades were formidable and in one instance almost led to an AVRE blade being sheared off. The clearance of the barricades drew only spasmodic fire and one gunman and one petrol bomber were shot dead. By 0700 hours all the objectives had been secured and the AVREs were re-embarked

and cleared from Northern Ireland. The use of tanks in any Internal Security Operation is always a very emotive subject and in the eyes of the media any tracked armoured vehicle is a tank. As a precaution the AVREs had ROYAL ENGINEERS painted prominently on their sides, but in the event there was little publicity and few pictures, and the significance of their use was lost in the general reporting of the operation. The parallel operations in Belfast also started at 0400 hours, where eleven battalions moved in to remove the barricades. 8 Field Squadron with 2 Troop 59 Commando Squadron under command operated in West Belfast in support of 39 Infantry Brigade, whilst the rest of 59 Commando Squadron operated in East Belfast and part of the City Centre in support of 24 Airportable Brigade. In some areas, both Catholic and Protestant local residents helped with the removal of the barricades and there were no casualties among the Security Forces or the civil population. The units established themselves in the 'No Go' areas mainly in schools which were on their summer holidays and provided facilities for both cooking and ablutions. Considerable engineer work was required to provide immediate protective works; as an example, 8 Field Squadron constructed 36 observation posts and erected 5,000 metres of barbed wire fence in the first 48 hours of the operation. 50 Field Squadron and 6 Field Support Squadron were deployed to assist with subsequent work.

The build up of the force levels necessary for Motorman took place at short notice. 8 Field Squadron, on exercise at Stanford in Norfolk was placed at 72 hours notice to move from 0900 hours on 15 July. 33 Field Squadron was on exercise at Sennybridge when warned for Ireland on 25 July but one troop had to be left behind to go on Exercise Strong Express in Norway and one from 10 Field Squadron found to replace it. Subsequently on 3 August the Commanding Officer 22 Engineer Regiment arrived from Tidworth with his Tactical HQ and took command of both squadrons.

From the start of Operation Motorman, Sapper troops were placed in direct support of infantry battalions living with them and working on clearance of barricades, construction of defences, fortifications, improvements to accommodation and the erection of camp structures. It became necessary during August to move out of the schools, as the summer holiday came to an end, and to find semi-permanent accommodation. 50 Field

Squadron developed Fort Monagh to house three companies in St Theresa's Community Centre with a fourth company at the Oliver Plunkett School, and in Andersonstown they started to build a three company camp which was later developed by PSA. The lull following the re-entry of the 'No Go' areas gave the engineer units an opportunity to tidy up, to consolidate and to strengthen the work already done. It also allowed high risk tasks, which had previously been carried out at night, to be undertaken in daylight and to higher standards of finish. Extensive screening, to various designs, was undertaken around military installations to prevent aimed rifle fire. The clearance of barricades, frequently under fire, was a continuing task, for which medium wheeled tractors with armoured cabs were used.[5] The work on the border on cratering and rooting unapproved crossings continued, and occasionally attracted fire.

During the year the force levels in the Province settled down and new tactical areas of responsibility were established as shown on Map 18. In the North West of the Province, 8 Infantry Brigade with its Headquarters in Londonderry was responsible for County Londonderry, much of rural County Antrim and the northern part of County Tyrone. The Royal Engineer squadron in support was found from BAOR and based at Shackleton Barracks, Ballykelly. 39 Infantry Brigade with its Headquarters at Lisburn was responsible for Belfast and its immediate surrounding area. The Royal Engineer squadron in support was provided from England on rotation and was based alongside 325 Engineer Park at the bridging camp at Antrim. The rest of the Province was the responsibility of 3 Infantry Brigade with its Headquarters at Lurgen, and the squadron in support which came from England was based at Castledillon. The squadrons were usually on roulement tours of about four months. In addition to these usual force levels, 50 Field Squadron deployed to Newtonbreda in the early part of 1972, and returned again in support of Operation Motorman, while 60 Field Squadron was sent in November 1972 as Province Reserve. The maintenance of this force level placed great pressure on the Corps, in a year when seventeen field squadrons were deployed to Northern Ireland, and in addition 23 Engineer Regiment were acting in the infantry role. As an example 60 Field Squadron, with one troop on disembarkation leave from an unaccompanied tour in British Honduras, and with other troops only recently returned from Cyprus and Gibraltar, was warned in September for a four

month tour starting on 1 November 1972, to be based at Long Kesh. Although 1972 was a very violent year requiring a high military presence its end saw the Security Forces beginning to re-establish welcome control.

1973-74 THE CHANGING THREAT

The next year was another of shootings, explosions and sectarian violence, but the numbers killed fell to around half those of 1972. Slowly the Security Forces' success rates for finding weapons and explosives increased and a significant number of individuals were charged with terrorist offences. On the political front the United Kingdom Government had put forward proposals for an 80 seat Assembly with a power sharing executive, and elections for this body were held on 28 June 1973 to take office on 1 January 1974. The Sunningdale Conference, called by the Government, was held in December 1973 between the eleven designated members of the Northern Ireland Executive and eight members of the Dublin Cabinet, to investigate the possibility of reaching agreement on power sharing, which meant proportional representation. The Dublin Government proposed the establishment of a Council of Ireland, as a non-executive forum for an exchange of views, but these proposals were unacceptable to the Protestant majority who were against power sharing and the Sunningdale Agreement. The loyalist splinter groups, the Ulster Volunteer Force (UVF) and the UDA demanded the abolition of the Executive and the Council of Ireland and then carried out attacks in Dublin and County Monaghan. Finally a general strike was called by the Ulster Workers Council for 14 May 1974 and lasted until 29 May, the coalition government led by Mr Brian Faulkner resigned and the power sharing executive collapsed so direct rule from Westminster was reimposed. Although the main source of terrorist activity continued to be from the PIRA, Protestant violence escalated throughout 1973 but subsided after the collapse of the power sharing agreement.

The major feature of PIRA terrorist activity in 1972 had been the rioting in urban areas, but the following year this virtually ceased and was replaced by shootings against the Army. In turn however the terrorists very soon learnt that they were at a disadvantage when operating against well trained soldiers and after suffering heavy casualties and having much of their

infrastructure destroyed, they changed their organization to enable them to operate as small active service units. They also moved their activities to the rural and border areas, where they could use booby traps, bombs, ambushes and remotely controlled devices in the relative safety of the open countryside and from which they could quickly escape across the border.

The engineer work continued much as before, but greater effort was put into preventing the movement of terrorists across the border. The RUC Station at Kinawley was attacked by a bomb on 26 April 1973 and a nearby grocer's shop bombed on 18 June and in both cases it was believed that the terrorists escaped back across the border using an unapproved crossing near Corriagunt Bridge. Border closures frequently drew protests from the local population and counter attack from the PIRA, and the essentials for a successful closure included ingenuity and speed. Therefore on 30 October a troop from 1 Royal Tank Regiment secured the area and 3 Field Squadron moved in, while an RAF Puma helicopter flew in a prefabricated Braithwaite tank which was lowered into position and subsequently filled with concrete. To complete the obstacle the surrounding road on the Northern Ireland side of the border was subsequently cratered for 200 metres of its length. Similarly 33 Field Squadron supported by C Squadron 1 Royal Tank Regiment carried out a number of border closures on 15 November 1973 near to Castlederg, in the area bordering on County Donegal containing many unmarked roads. Over a period of three days the squadron, with the help of Wessex helicopters, placed concrete blocks on several unapproved crossings. These operations were typical of many carried out at the time.

The change of tactics by the terrorists included the introduction of booby traps and other improvised explosive devices (IEDs) in urban areas and as the search for these and conventional weapons intensified, search techniques as described later in this chapter were developed. There was also evidence of tunnelling by the prisoners in Long Kesh, which was watched as it progressed towards the wire. When 9 Independent Parachute Squadron were deployed to locate it they found a further tunnel in Crumlin Road jail. The squadron also carried out a large number of booby trap searches and for these operations the squadron sergeant major W D Edmonds was awarded the MBE for gallantry. The increase in sniping and

inter-sectarian killings required the establishment of a network of observation posts which had to be made stronger than the previous ones of corrugated iron and sandbags; sangars made of concrete blocks with large makrolon picture windows became a standard feature.

The careful gathering of information as a result of increasing cooperation from the public contributed to the security forces' successes. Close surveillance was undertaken of areas where terrorists lived and where they kept their weapons, and also on likely supply routes. On 23 January 1973 a patrol of six soldiers from 26 Armoured Engineer Squadron took up observation in an apparently deserted farmhouse near Saintfield, County Down. A preliminary search of the farmhouse had revealed a 9 millimetre pistol in some old furniture, and large quantities of consumer goods including carpets, refrigerators, wines and spirits, which were subsequently found to have been stolen. After a wait of three days in extreme discomfort, the patrol saw a car containing four men drawing up at the farmhouse. One man took a rifle from the boot of the car and when challenged made as if to use it, whereupon he was shot and wounded, and the other men were arrested as they tried to run away. A full search of the area revealed two more rifles and a quantity of ammunition.

Operation Despite

On 15 October 1973 at about 1800 hours, Republican prisoners at Long Kesh began to attack prison officers, injuring three of them. Groups of prisoners armed themselves with pieces of broken furniture, started numerous fires in their huts and attempted to break out. During the night intermittent fighting continued, and the fires continued to burn, but in the morning order was restored though major damage had been done and a new kitchen destroyed. On 21 October Headquarters 36 Engineer Regiment with 20 and 50 Field Squadrons were deployed under Operation Despite to rebuild the prison. Over a ten week period a total of 72 Nissen huts were built together with five watch towers and a considerable length of fencing around the compounds.

Deployment

By 1974 all engineers were under command of the CRE with the

field squadrons working in support of brigades. In practice the workload was uneven between the brigades, and the CRE used traditional flexibility to operate across formation boundaries. Sappers from every squadron worked on large projects and tradesmen were switched between units to meet the demands for their speciality. On such occasions as major searches or during the strikes, teams were concentrated in Belfast or Londonderry, as appropriate. Because of political and physical difficulties, which included the intimidation of staff and contractors, the PSA was not able to carry out its normal role. An arrangement was made that design was largely their responsibility, often with military assistance as was the letting and payment of contracts for materials: the construction work was carried out by military personnel, who were subject to inspection and handover procedures as would have been applied to a civilian contractor. HQRE included Military Engineer Services staff who provided design services, quality control, and supervision of work. A survey of all company bases was undertaken to assess whether the services could be maintained in the event of sabotage or industrial action, which led to a number of improvements including the duplication of systems, the provision of standby generators, and the drilling by 521 STRE of a number of emergency wells.

The normal force level of three field squadrons was increased from time to time by anything between a troop and a squadron, to reduce the backlog of work. Most of this work was to strengthen defence works, to improve their appearance and to reduce the longer term maintenance requirements. After 1974 squadrons were heavily committed to producing search teams, which when added to their own overheads and guarding, and with up to two sections away on Rest and Recuperation, left only half the squadron strength available for work. As the requirement for better and longer lasting structures increased so a far greater emphasis was placed on the use of construction and electrical and mechanical skills by tradesmen.

The squadron based at Antrim operated boat patrols for the infantry on Lough Neagh, the largest lake in the British Isles. The fringes of the lake were rural areas, with a mainly Catholic population. Terrorists frequently used boats to move weapons and gunmen across the Lough, but the patrols were able to reduce such traffic and to deter terrorist action.

General Strike

The Ulster Workers Council called a general strike for 14 May 1974 to protest against the Sunningdale Agreement and the power sharing executive. This action had wide support from the Loyalist politicians, the paramilitary UVF and the UDA, and the general support of the Protestant majority. The strike badly affected the output of the power stations of which there were only four in the whole Province, and on which so much of the population depended. On 15 May, Protestant paramilitaries forced thousands of people on their way into work in Belfast to return home, road blocks were set up around the city and shopkeepers were ordered to close. The Army kept a low profile, but by then forty per cent of the Province was without electricity and frequently power black-outs were lasting for six hours. Additional units were sent to the Province, among them 11 Field Squadron, 50 Field Squadron and around 150 professional and technical staff from all three Services to operate the power stations. A covert reconnaissance of the Ballylumford Power Station showed that it was not possible for the Army to run it without the cooperation of senior staff, which could not be guaranteed.

The situation was very serious and on 19 May the Prime Minister in London declared a state of emergency in the Province. The level of intimidation increased as did the number of road blocks operated by the paramilitaries. The Army and the RUC were ordered not to intervene, but food and milk shortages started to become apparent. The Army did not wish to become involved in strike breaking, which was totally unacceptable to the British Government, but managed to persuade the UDA to take down some of the barricades in the Shankill and Sandy Row areas of Belfast. The telephone system began to fail due to the intermittent electricity supply even though standby generators were shipped in. The supply of oil and petrol also became critical and on 27 May the Army took over the installations in Belfast and Londonderry as well as 21 filling stations throughout the Province. The sewerage system also began to breakdown due to the lack of both electricity and maintenance, and raw sewage flowed into the rivers. Plans therefore had to be made to evacuate houses in areas likely to be flooded by this effluent. On 28 May the Executive resigned, the Northern Ireland Assembly was prorogued and direct rule from Westminster reimposed. The Loyalists having shown their strength and succeeded in bringing

down the Executive quickly allowed the violence to reduce and the infrastructure to return to normal.

Living and working conditions

The conditions under which Sapper units lived and worked were varied, but a general pattern was beginning to emerge for units on roulement tours. The normal works dress was combat kit, with flak jacket and beret; steel helmets were carried in vehicles, but their visors were easily scratched and the helmets were therefore seldom worn. Arms were always carried, with weapons loaded when outside military bases; this necessitated the construction of weapon unloading bays at camp entrances and a checking drill when entering and leaving camp. Vehicles normally travelled in pairs, except in a limited number of safe areas, and all movement in the dangerous areas was most strictly controlled.

Camp conditions varied but quarters were usually cramped and frequently double or triple bunked, though in the major camps such as that on the airfield at Ballykelly there was scope for off-duty relaxation and soldiers were even allowed out in civilian clothes in groups of no less than four. Entertainment was provided within camp confines, and discos - to which the local girls came in great numbers - were very popular, even though the girls were searched on entry and counted several times during the evening. Sport was organized wherever possible, but was curtailed by the problems of travel. Inevitably, Asian traders with their long tradition of following the British Army, appeared in many unit locations and provided the 'char wallah' service of snacks, soft drinks and refreshments at all hours of the day and night. Units often worked from seven in the morning to six at night, six days a week, with Sunday usually devoted to administration, sport and improving the unit accommodation. There was also a period of 'Rest and Recuperation' during each tour, when up to a section at a time were away from the squadron, with the men returning either to the mainland or back to their families in Germany.

On 23 July 1974, 33 Independent Field Squadron took over in support of 39 Brigade and became the first resident squadron, accompanied by its families, based at Antrim. 325 Engineer Park lived alongside and was further expanded to cope with the increased workload in providing stores, workshop and plant

repair facilities. The engineer support for 3 and 8 Infantry Brigades was provided by roulement squadrons from UK and BAOR respectively. In the infantry role 32 Engineer Regiment with 26 Armoured Engineer Squadron was based at Long Kesh from January to May 1974; and 26 Engineer Regiment with 73 Amphibious Squadron under command was based in the Bogside of Londonderry from July to November 1974. 32 Field Squadron was deployed as infantry with 32 Light Air Defence Regiment to the Ardoyne from October 1974 to February 1975.

1975 SECTARIAN VIOLENCE

The PIRA declared a truce over Christmas 1974 lasting to 16 January 1975 which was later renewed and lasted from 9 February to 7 April. The incidents of violence initially decreased but as the year went on escalated again, with the main casualties being civilians resulting from sectarian attacks. A further political initiative was launched in May 1975 by the Westminster Government with elections and a Constitutional Convention, but still this approach was rejected by the Protestant majority; the Convention was eventually dissolved in March 1976 by the British Government after yet again a refusal by the Loyalists to accept power sharing. The other major change in the year was the ending of internment; between 24 July and 5 December 1975 all internees were progressively released. There was a view that internment was a good 'recruiting sergeant' for the IRA, and it certainly strengthened the bonds between the PIRA and the Catholic community.

After the 'Free Derry' areas had been occupied by the Army in the Summer of 1972 a new base camp had been established overlooking the Creggan Estate. It was built on a barren hillside, opposite a very hostile area and required a strong defensive barrier, consisting of a wall 100 metres long, and 3.65 metres high, which contained some 40,000 sandbags and 1,100 tons of sand. The original construction had been a major operation with sand being brought from the mouth of the River Foyle to Fort George in Londonderry where soldiers of 2nd Battalion Light Infantry bagged it and moved the filled bags to the new site. Here the bags were laid by men of 1st Battalion Grenadier Guards supervised by 33 Independent Field Squadron, over a period of several weeks. By late 1974 the wall was deteriorating

as the hessian of the sandbags rotted and it became clear that the wall might only last for another winter at the most. Although it appeared that there was a diminishing threat, the requirement for the wall was confirmed. The outer face of the wall, which was over soft ground, was directly exposed to the Creggan Estate, and the campsite was filled with the battalion and its vehicles leaving very little space for the Sappers to build a mass or reinforced concrete wall. Because of these difficulties it was decided to refurbish the existing wall by the use of 'Gunnite', a process requiring a mixture of dry sand and cement to be carried along a flexible hose under air pressure and mixed with water immediately prior to being sprayed on the target. To help with adhesion and to provide a measure of reinforcement, chicken wire mesh was placed over the wall prior to the application of the mix. The task was completed in March 1975 in a twelve day period, despite delays caused by rain and snow, by 12 Field Squadron.

Training

The need to train units for Northern Ireland had resulted in the building of a close quarter urban battle range at Hythe in Kent. Units already in Northern Ireland needed to continue with such training and in 1976 a feasibility study was started to provide a comparable range in the Province. The site chosen was on the large training facility at Ballykinler. Planning, design and survey were undertaken by 62 CRE, MES and HQRE NI; the area was cleared and levelled by plant operators from the field squadrons in Castledillon with the workforce accommodated in the Weekend Training Centre. The main construction work on the range was undertaken by 11 Field Squadron, who completed the task a month earlier than planned despite great difficulties in obtaining supplies of materials. Much of the finishing work, including the installation of electrical services and communications, was undertaken by subsequent field squadrons and by Royal Signals. When the range was complete it provided a typical urban environment found in the Province, with 50 metres of streets and alleyways formed by lightweight precast concrete 'Slabcon' facades and similarly faced buildings representing two and three storey terraced houses and shops, all with lighting for day and night use. Control towers were also erected to house the directing staff and from which the various

targets, special effects, lighting and closed circuit TV were operated. It was a much valued, and well used training area.

1976 - 80 THE LONG WAR

In 1976 the support for terrorist groups declined and the effectiveness of the Security Forces led the PIRA to re-evaluate its organization and its tactics. Its overall policy was to force the British to withdraw and to this end the Wing was prepared to settle for a long drawn out war. The PIRA therefore split into two parts, small active service units of up to five individuals on the one hand to carry out operations and Provisional Sinn Fein on the other to promote political activities, propaganda and work in the fields of housing and unemployment. Along with these changes the PIRA upgraded its weapon systems with a new range of firearms, including the Armalite rifle, machine guns and rocket launchers, while the systems for detonating remote IED's and for firing mortars and similar weapons were improved.

Mortars

The IRA had used primitive mortars from the outset of the campaign. At the beginning they were very crude devices, usually consisting of gas cylinders containing a few pounds of explosives, which were usually fired at ranges of less than 100 metres and were frequently inaccurate or did not even leave the tube. Banks of as many as 16 mortars were sometimes used from the back of a lorry or attached to a farm tractor, but slowly the PIRA realised the ineffectiveness of these weapons and reduced the number of tubes, increased the size of the mortar bomb and its explosive content and improved both range and accuracy. As many of the soldiers in isolated stations were living in portakabins or similar buildings, they were very vulnerable to this form of attack. Trials were carried out on Salisbury Plain by MVEE Christchurch, RARDE and 62 CRE (Construction) to test materials to give greater protection and a form of chipboard reinforcement was selected. As the size and effectiveness of the mortar bombs increased it became harder to prevent the missiles penetrating the buildings. Metal screens covered in chicken wire were erected over "soft" buildings which either caused the mortar to detonate prematurely above the building, or to hang up on the wire and not explode. Early in 1976 a similar

programme was started to protect all operation rooms and communication centres against such attack, which had to be extended after attacks in August and October on the base at Crossmaglen where the more sophisticated Mk 8 and Mk 9 mortars were used, the latter containing 10 pounds of high explosive.

Crossmaglen

At the border village of Crossmaglen an infantry company base had been set up alongside the RUC Station overlooking the main square of the village. The area was one in which terrorists operated freely and movement into and out of the base had to be by helicopter as there was a very high threat of ambush or bombing of vehicles moving by road. In 1977 efforts were made to improve surveillance in the village and on 9 March an elevated sangar was constructed by 53 Field Squadron, made in prefabricated sections and flown in by helicopter, the whole operation being completed in three hours. Meanwhile 62 CRE (Construction) was designing a mortar proof building to house up to 72 men, which was to be built adjacent to the RUC Station. The design was for a bonded blockwork building, buttressed at intervals, with glass reinforced concrete plaster inside and out, the roof to be made of reinforced concrete with a nine inch cover of sand; the whole to be air conditioned and water, sewage and electricty services provided. This project took up a major part of the engineer effort in 1976 and 1977, particularly in 3 Infantry Brigade area, and required a full-time clerk of works for the duration of the project. The effort involved not only the protection of the base and the workforce, but also the provision of cover for the route into Crossmaglen whenever the carefully planned road convoys delivered material, totalling over 4000 tons, to the base for its construction. By 1978 the shelter was complete and the rear perimeter wall, a helicopter landing zone within the base, a new drainage system and an internal road had all been added.

Belcoo Bridge

In the early hours of the morning of 15 May 1976 shots were fired at the RUC Station in Belcoo. In the resulting follow-up action, in which three policemen were killed and a fourth seriously wounded by a booby trap device, it was established that the gunmen had escaped by way of a disused railway bridge

spanning the river which was the border. It was decided that the bridge must be demolished to reduce the terrorists' freedom of movement and a temporary barricade was immediately erected. On 4 June Condor Troop 59 Independent Commando Squadron moved in to demolish the 50 year old steel girder bridge. As the bridge was close to houses on both sides of the border the minor bridge members were removed by cutting with oxyacetylene equipment, but the four main chords were cut using Hayrick charges.

Strikes and Marches

In May 1977 a general strike was called by the Ulster Unionist Action Council to protest against the elections which introduced power sharing on local councils. There were many cases of intimidation of workers and much disruption, a total of 730 barricades on the streets to be cleared, and Larne Harbour was closed for several days, but the general level of protest was not as high as in 1974. The Province was reinforced by extra toops and 3 Field Squadron, 52 Field Squadron, two troops of 20 Field Squadron and many individual reinforcements were sent to maintain essential services. The strike was short lived, but it was a useful reinforcement exercise and allowed many outstanding tasks to be undertaken using the extra units in the Province.

The celebration of anniversaries traditionally held a prominent place in the life of Northern Ireland. There was a marching season with parades and bands, when the Loyalists celebrated the Battle of the Boyne and the siege of Londonderry. The Republicans similarly commemorated events from the troubles, such as Bloody Sunday on 30 January, the Anniversary of Internment on 9 August and various hunger strikes, usually with marches, demonstrations, hooliganism, bonfires and varying degrees of violence. In 1977 a particular effort was made to curtail the violence in Belfast on 9 August, to keep roads open and traffic moving. In spite of all these efforts some 36 vehicles were hijacked and set on fire, 30 of which were cleared by RE teams using armoured medium wheeled tractors to lift the vehicle into ten ton dump trucks for removal. The main effort was concentrated on a roundabout in the Turf Lodge area onto which a large heap of burnt out vehicles had been piled which was cleared on 12 August in a combined operation mounted by Royal Engineers and Royal Marines.

The Queen's Visit

HM The Queen visited Northern Ireland on 10 and 11 August 1977 to commemorate her Silver Jubilee Year. The IRA had promised 'a day to remember'. In the event pre-emptive arrests by the security forces and a massive security operation ensured that the occasion was peaceful, memorable and happy.

2 Armoured Division Engineer Regiment were in Belfast in the middle of an infantry role tour, 12 Field Squadron covered The Markets, 39 Field Squadron the City Centre and 16 Field Squadron the mainly Protestant Village area. 43 Field Support Squadron based in Ballykelly had the responsibility for searching the University at Coleraine for Her Majesty's visit and this included an examination of every book in the library.

On 14 November 1977 a United Kingdom wide firemen's strike occurred, which lasted for 10 weeks. Northern Ireland was included and in addition to the Army having to man the War Reserve fire engines brought out from Home office depots, the fire crews had to be guarded whilst carrying out their duties.

Forkill

Meanwhile the mortar attacks by the PIRA continued and on 13 January 1978, two Mk 9 mortar bombs were fired from a flat bed lorry parked outside the base at Forkill. Severe damage was inflicted on the base and there were nine casualties, but fortunately the buildings close to the impact area were unoccupied or this figure would have been much higher. The village was extremely hostile and after the ATO had cleared the mortar lorry, as it was being driven away a cleverly hidden booby trap exploded. This attack following that at Crossmaglen led to a decision that permanent mortar protection was required at Forkill and a project, Operation Consult, was set in hand. The existing accommodation consisted of wooden huts around the RUC Station at a road junction in the centre of the village. As the area was very close to the border and in an area of high terrorist activity, all normal movement was by helicopter from Bessbrook. The whole area was overlooked by hills and any movement by road required a major operation to secure and search the route. The accommodation was rebuilt with a three storey building, the top floor of which was designed to be sacrificial used only to house non-essential stores. In addition to the main building, cover-from-view screens, internal roads and a new transformer were also provided.

THE INFANTRY ROLE

As has already been mentioned, from time to time Royal Engineer units were deployed in the infantry role, with the tasks of keeping up pressure on the terrorists, assisting with the maintenance of law and order, and working towards a situation where the RUC alone would carry out policing. The regiments to carry this out were found from BAOR and prior to deployment had to undertake a considerable period of training and reorganization. A minimum operational strength of 550 all ranks was specified and regiments were often reinforced by a squadron from elsewhere. Within each unit there was also a need to appoint and train men for a number of specialist roles such as Community Relations Officers, Press Officers, Search Team Advisers and a substantial Intelligence Cell. For two months prior to deployment thorough training was undertaken at the Hythe Training Area where there was a replica of a group of streets in the Lower Falls area of Belfast, complete with graffiti, rubble, cars and inhabitants. Also use was made of the Close Quarter Battle Ranges referred to earlier.

The experiences of 35 Engineer Regiment who took over East Belfast from the Queens Own Hussars in December 1972 are typical of unit tours in the Infantry role. The regimental echelon was based on HMS *Maidstone*, with RHQ in Mountpottinger RUC Station, and their "patch" covered a huge area of Belfast including both hard Republican areas and potentially explosive Loyalist areas where many hard line UDA members lived and from which the UVF later emerged. Because of the extent of the area which included many housing estates, patrolling was usually in landrovers, thus losing some of the personal contacts which arise with foot patrols. During the tour some significant arms finds were made, plastic baton rounds were used for the first time during a day long riot in the Willowfield area, the vote to remain in the UK was supervised and a major UDA march was monitored. At this time this Association started vigilante night patrols in the housing estates, which were confronted and if carrying weapons, disarmed. Relations with the members were difficult and uneasy as their reactions were unpredictable and the Security Forces had to be very circumspect in dealing with them. The RUC meanwhile were being encouraged to take a greater part in Security Force actions and to take a positive line in Republican areas. Some local community work was

undertaken, which proved popular with the Sappers as their technical skills were employed, including the construction of children's playgrounds and an indoor gymnasium and helping to look after children in the local spastics centre. At Christmas many small parties were sponsored by units and children entertained; many soldiers received invitations to local houses, each of which had to be vetted by the RUC before acceptance. Attendance at discos was not allowed.

On this tour, the main tasks were patrolling, a considerable number of static 24 hour guards which were not popular with the soldiers, and urgent sorties to local events in landrovers and the standard wheeled APC, commonly known as the 'Pig'. Although most of the men operated in uniform, those working in the Intelligence Sections and in plain clothes had long hair, wore jeans, casual clothes and training shoes. As time went on more time was spent on searching for arms, ammunition and explosives. In 1977 when 2 Armoured Division Engineer Regiment was serving as the Belfast City Centre battalion, during their four months tour they searched 150 houses and 12,000 vehicles and found four weapons and a large quantity of explosives. 340 people were arrested, of which 25 were charged with serious crimes. The regiment sustained three casualties in ambushes or from sniping, all of whom recovered, although one soldier lost his hand due to the explosion of a parcel bomb. A major success came when 16 Field Squadron foiled a robbery at a Post Office and a soldier captured a gunman with a loaded weapon. But incidents such as this were rare and the statistics given above do not reveal the hours of hard, frustrating and often unrewarding work involved.

SEARCH

As the pressure on terrorists increased they improved their methods of concealing weapons, explosives and clothing in caches, and developed ways of hiding them whilst in transit. The Security Forces accordingly developed techniques for searching for these weapons and also for revealing explosive devices hidden in buildings, culverts and hedgerows. There was also a need to preserve such finds so that they could be used as evidence. In some instances they were left in place, under surveillance, in order to catch the terrorist collecting them. Deliberate search operations were mounted to disrupt terrorist

activities, and this type of search was particularly valuable as it was one of the few offensive actions permitted to the Security Forces. Searching was an all arms responsibility and the average annual figures for searches undertaken were over one million vehicles and 30,000 houses.

At the start of the campaign, search courses were run on council property awaiting demolition at Bangor, organized by the permanent staff of 74 Engineer Regiment (V) to train combat arms and RUC search teams. In 1971 it was decided that each major unit should have four search teams and these were trained on a one week course run at RSME by 24 Field Squadron. During the period January 1972 to January 1973, 18 such courses were run, but then the decision was taken to increase the number of teams to six for each battalion and two teams in each field squadron. The RSME had to reorganize its training to cater for this increased load, and the responsibility fell to the Field Engineer School. In 1973, 23 courses in search training each capable of taking 60 soldiers were run and this time RSME was also responsible for training all Unit Search Advisers, all unit search teams from UK based infantry regiments, all RE Specialist Search Teams, and those from TA units and the RAF Regiment. In BAOR a search training wing was established at Sennelager to train all arms search teams for BAOR based units. This great increase in training meant that by 1976 there were more than 250 trained search teams in the Province.

The increased need for searches led to CRE Northern Ireland being made responsible to Commander Land Forces for all search matters and in HQRE a Search Cell, commanded by an infantry captain was established. The cell was responsible for close liaison with all agencies involved in search operations, such as EOD, RMP and RUC; it also examined terrorist techniques, disseminated ideas and lessons from operations, and provided co-ordination between HQ Northern Ireland and the training establishments. Each infantry battalion had a Unit Search Adviser and two search teams of six men in each company. The field squadrons in support of brigades had a Search Co-ordinator, up to three RE Search Advisers, and up to eight Specialist Search Teams. In operations where there was a high risk of meeting IEDs it was mandatory for the search team to be RE. The unit diving teams were widely used in searches, wholly or partly underwater, in water tanks, rivers, lakes and bogs or even in sewers and drains. In 1973 the diving team of 9

Independent Parachute Squadron carried out a survey of all the man-navigable underground waterways of East Belfast because of the risk that they might be used by the terrorists to store weapons and ammunition. One of these waterways ran under the Distillery/Grosvenor Road area and ended up in York Road railway station, where one day early morning commuters were astonished to be accosted by a rubber suited diver seeking small change to enable him to use the public telephone.

SURVEY

The Survey Section in Northern Ireland was very small and for most of the period there were only four men: a warrant officer survey adviser, a cartographer, a field surveyor and a map storeman. This small staff carried out an enormous amount of work: special maps of the tribal make up of Londonderry, Belfast and Craigavon, street plans for urban operations, border areas maps and crossing places, and during the major strikes, overprints of the electrical generator and distribution systems, water supply and sewage systems and petroleum distribution. From time to time the Survey Section was reinforced to carry out work for the Ordnance Survey Northern Ireland, who could not get surveyors to work in the border areas. In 1978, RE surveyors resurveyed the border in South Armagh, which required the soldiers to travel in unmarked cars and to wear plain clothes, though their identity was readily revealed as they were loaded down with theodolites, mapboards and banderoles. The surveyors also carried out a great deal of work in updating the ground control throughout the Province, in annotating maps to show the use of buildings, in checking street names and in filling in details which the air surveyors could not provide from photographic coverage. A Taciprint vehicle was deployed in Northern Ireland as a trial, but the service from England was so prompt that it was withdrawn: overprints could be drawn by surveyors in Northern Ireland, flown to England, printed at Barton Stacey and returned the same evening. The surveyors also undertook a number of unconventional tasks. When a new entrance was required at Fort Monagh it was not possible to carry out a ground survey due to the threat from snipers. A photo reconnaissance sortie was flown by a Beaver and the resultant photographs used to create a contoured, detailed large scale map which was in the hands of the CRE within a week.

An unlikely task fell to 42 Survey Engineer Regiment in 1977. Her Majesty's Prison at Magilligan held 260 specialist category prisoners and 140 other criminals. From August to December the regiment provided the Prison Guard Force, of one officer and 24 men, with the primary role of external protection so that the prison staff could carry out their work without fear of interference. These duties included the manning of watchtowers, sentry duty, foot and mobile patrols which were supplemented by a full programme of sport and weapon training to relieve boredom. The Prison Guard Force was also responsible for providing the night guard at Clooney Park Camp in Londonderry. The highlight of the tour came on 22 October when a major operation was mounted to move by helicopter all the prisoners with allegiance to the UDA and the UVF to the new Maze prison at Long Kesh.

TAILPIECE

Throughout the troubles in Northern Ireland members of the Corps carried out their duties in exemplary fashion, using the opportunities to practise their individual skills as soldier, sapper and tradesman. In addition to the work described here, Sappers of all ranks also served with distinction with the UDR, 22 SAS and 14 Intelligence Company. The standards of self discipline and restraint displayed throughout in the face of extreme provocation were those of which the Corps can be rightly proud.

This chapter has necessarily dwelt on the military aspect of service in Northern Ireland and it is a matter of regret that the deep seated political and social tensions which were the cause of the operations were still unresolved at the end of the period covered by this volume. Nevertheless it can be recorded that postings to Northern Ireland were normally only unwelcome to those who had to undertake frequent unaccompanied emergency tours, and usually offered sound professional experience and the chance for units to build up a good team spirit at all levels. Full length tours in permanently stationed units were often sought after as despite the operational background they offered an enjoyable life-style, good facilities for sport and recreation and, for families, some of the best primary school education available in the United Kingdom.

FOOTNOTES TO CHAPTER IX

1. The new province was often referred to as Ulster, though the pre-1921 one of that name also included Donegal, Cavan and Monaghan.
2. The RUC at this time included the "B Specials", a body whose existence was particularly resented by the Catholics as they regarded them as vicious Protestant extremists.
3. The first commander of the UDR was a Sapper, Brigadier L Scott-Bowden.
4. In April 1971 the E-in-C (Major General F G Caldwell) decided that a detailed study of the border should be undertaken to investigate all aspects of its control including the use of new surveillance devices. Lieut Colonel G W A Napier was given this task together with a Civil Service scientist. Using a civilian hire car and in the guise of fishing holiday makers they examined every crossing point along the 330 mile border and assessed the requirements for control. Apart from one small brown trout and a lively pike, the product of the investigation was a report giving details of each crossing site, in itself a useful document. To the best of Colonel Napier's memory the number of battalions required for total surveillance of the border worked out at 24.
5. Early in the campaign it became apparent that armoured cabs would be needed to protect plant operators from small arms fire. A programme known as Turtleback was carried out at great speed at MVEE Christchurch to equip some 48 light and medium wheeled tractors over four months in 1972, complicated by the need to revise the specification in midstream when the terrorists started using high velocity armour piercing rounds. Other defensive devices developed at Christchurch specifically for use in the province included rapid assembly walls and blocks to provide protection to sapper working parties, and stand off chain link screens to counter rocket and mortar attack against buildings. Among the more bizarre requirements was one for a device which could drop an armoured glass observation panel instantly in front of a sentry, should he come under aimed fire. As the glass in its frame weighed some 170 lbs, much ingenuity was required to ensure that the device, when it operated did not either do the sentry a serious injury, or shatter the glass!

CHAPTER X

ROYAL ENGINEER SUPPORT FOR THE RAF

INTRODUCTION - TRANSFER FROM RAF AIRFIELD CONSTRUCTION BRANCH - The Plan - Choice of Base Location - Manpower - Equipment - Personnel Implications - OPERATIONS - Far East - Arabian Peninsula - Libya - AIRFIELD DAMAGE REPAIR - HARRIER SUPPORT - Restructured Command and Control - STAR AND D COMMITTEE.

INTRODUCTION

As part of its normal engineering capabilities the Corps has always retained some capacity for the construction of airfields. By the early 1960s such work was usually carried out by field units in the normal course of their duties. Examples were the building by field squadrons of jungle airstrips during the Borneo Confrontation and Crown airfield in Thailand. However, when the duties of the RAF Airfield Construction Branch (ACB) were assumed in 1964, it was necessary for the Corps to formalize its particular responsibilities for providing support to the RAF, and a new branch was formed in MOD within the Directorate of the Brigadier Engineer Plans to coordinate these activities, known as Engineer 2 (Airfields). The first incumbent as Colonel E Engineer 2 was Colonel J R E Hamilton-Baillie, from 1 October of that year.

TRANSFER FROM RAF AIRFIELD CONSTRUCTION BRANCH

The Plan

The transfer of responsibility was announced in Parliament on 16 November 1964. A Joint Service Working Party had been set up by the E-in-C(A) and the DGO (RAF) to coordinate arrangements for the take over, with Colonel E Engineer 2 as chairman and by the end of the year the main stages of the plan were agreed. However, by this time the uncertainty that had hung over the future of the ACB for many months had caused recruitment to dry up and the RAF had found themselves unable to maintain all four operational squadrons. 60 Field Squadron had already taken over from 5004 (AC) Squadron RAF in Aden and the latter had returned to Waterbeach for disbandment. The

plan was that this standard field squadron and the three other RAF squadrons, 5001 in Singapore, 5002 in the UK supporting 38 Group, and 5003 for general RAF support including overseas reinforcements from the UK, were to be replaced by RE Field Squadrons (Airfields) in 1965. 10 Squadron (Airfields) started to form at Maidstone and was due to relieve 60 Squadron at RAF Khormaksar in Aden in August. The other three new field squadrons to be raised were allotted the numbers 51, 52 and 53, so that by using them to replace 5001, 5002 and 5003 respectively, some sense of continuity could be achieved. By the middle of 1965 an establishment for 10, 51 and 52 Field Squadrons (Airfields) was well under way towards approval with a larger one for 53. The latter was necessary as this unit would have special responsibilities for contingency plans abroad, for crash rescue and other special tasks in the UK.

Choice of Base Location

51 Field Squadron (Airfields) started forming at Ripon in August 1965 with a view to moving to RAF Seletar in Singapore in January 1966. Plans for the two UK based squadrons were held up over a decision on their permanent location. Waterbeach was the obvious choice: it had been the depot of the ACB as well as the home of 5002 and 5003 RAF Squadrons, and it had good permanent barracks with excellent technical accommodation. The runway could remain in occasional use for RAF training, and tests of undercarriage design were planned on an earth strip beside it for which an airfields squadron was needed on the site to prepare and alter it during tests. Disturbance of married RAF personnel who transferred or were seconded to the Corps would be avoided and the transfer of special tasks would be easier. Against this it was said that the savings on the closing down of RAF Waterbeach and the disposal of the barracks had been taken into account in the financial calculations on which the whole take over had been approved and therefore to keep Waterbeach at this stage would be unacceptable. After much lengthy and heated argument, it was agreed that there was no spare permanent army barracks for the new RE units and that to give up the excellent barracks at Waterbeach with all its advantages and build new accommodation elsewhere would be irresponsible. Waterbeach became the home of 52 and 53 Squadrons and of a CRE and HQRE to command them and an Engineer Equipment Workshop REME to support them: the

whole eventually forming 39 Engineer Regiment (Airfields). These units started to form during 1965 and Waterbeach Barracks was formally handed over on 1 July 1966.

Manpower

Arrangements were also made to fill a variety of posts world wide as replacements for ACB personnel. Amongst these were an increment to the Middle East Park Squadron and an Engineer Equipment Workshop in that Command and a similar provision for the Far East; a detachment of 16 sappers in Cyprus and an officer and two junior ranks at Gatow; five logistics officers of the rank of lieut colonel in NATO Headquarters and a Colonel (Airfields) in HQ FARELF. In all, posts for 61 officers and 1070 soldiers were created, corresponding to the increase in army manpower authorised when the take over was approved. At the lower levels RE tradesmen could fill the posts, but the senior NCO and officer posts required clerks of works and technically trained officers for whom opportunities in the Corps had dwindled and which were, therefore, not so easily filled.

Equipment

It was agreed from the start that all vehicles, plant and RAF ground stores (except weapons, radios and cooking equipment) should be taken over by the RE squadrons from their RAF predecessors. Some, such as the Case dozers with which the ACB had only recently been equipped, were the envy of other Sapper units.

Personnel Implications

Though the transfer of equipment went smoothly, the same could not be said for the transfer of personnel. Broadly, the alternatives open to the RAF officers and airmen were either to transfer to the Royal Engineers direct, subject to acceptance and some retraining, or to be seconded to the Royal Engineers for employment in airfields posts for a limited time, or to accept other employment in the RAF, or premature retirement or discharge. The greatest difficulty was over the conditions of transfer for non-commissioned ranks. The previous terms of service of many included a guarantee of service to fifty five, which could not be matched in the Army. About 75 per cent of the airmen were entitled to automatic promotion on time and qualification criteria which again were not paralleled in the

Corps. It proved impossible to get financial agreement to reasonable compensation for these losses and despite much trouble taken over every individual case, the great majority of airmen and a number of officers left the service. Many of these were highly skilled and their loss caused sadness and some ill feeling in RAF circles.

The main concern that the RAF had over the takeover was that the Sappers, doing much more military and combat engineer training than the ACB, would be less technically expert than their RAF predecessors. They also feared that in an emergency airfield units might be diverted to non-Air Force tasks deemed to be more urgent. Early experience showed there was some truth in the first concern, but the second was much less valid. Indeed, with the Engineer-in-Chief now responsible for all airfield construction support, the full range of non-specialist RE units became available to augment the airfield squadrons should they be required.

For the Corps the addition of RAF support to the rather thin and declining elements of RE Works overseas opened up most encouraging opportunities and new challenges for those officers interested in following the professional engineering side of their careers. Field Squadrons (Airfields) were a natural command for many engineering course trained officers and a significant number selected had also, seeing the opportunities of double qualifications, sat the examination and attended Staff College. The command of the Airfields Regiment, while it existed as such, was exclusively placed in the hands of a chartered engineer providing a much needed command opportunity for the best in that career stream. At the lower level the establishment of garrison engineers (including electrical and mechanical officers) expanded and the clerks of works rosters required strong recruitment to make up the numbers needed. This was not easy with a two year training course and the residue of RAF specialist personnel was essential in the early stages of the new commitments, but these teething troubles were soon overcome and the technical side of the Corps rapidly revived in morale and expertise.

OPERATIONS

Far East

In January 1966, the newly formed 51 Field Squadron

(Airfields) duly moved from Ripon to Singapore and took over from 5001 Squadron RAF. A few months later, the first Colonel (Airfields) post in HQ FARELF was established, filled by Colonel J R de G Pilkington. The squadron's first major construction task was the building of a tactical airstrip for medium range transport aircraft at Penarek in Malaysia. completed in 1967.

Meanwhile, the spate of activity on airstrip construction by a variety of units, largely arising from operations in Borneo, gave rise to some misunderstanding at home, both within the Corps and elsewhere, about the complexities of such works when carried out in the jungle. This provoked CRE (Ops) FARELF, Lieut Colonel P F Aylwin-Foster to circulate a paper in October 1967 which, amongst other points said:

> "There is clearly a body of opinion in the Army which believes that we have reached the age of the instant airstrip. As a result of exercises in the UK in recent years in which Beverley strips have been "knocked up" in less than 24 hours in such places as the training area at Stanford, there is a dangerous tendency to believe that this is now the normal pattern. Such a belief is entirely false. In normal Far East conditions it is unrealistic to expect a short range transport strip to be ready for continuous use in less than three weeks or a medium range transport strip in less than several months".[1]

However, on the satisfactory conclusion of Confrontation in 1966, and even before the plans for an eventual evacuation of the area were being discussed, the pendulum swung the other way and there was insufficient work to justify the retention of an airfield squadron in Singapore. In March 1968 51 Field Squadron (Airfields) therefore duly returned to the UK. Some reactivation of Penarek was necessary for the major UK reinforcement exercise Bersatu Padu carried out in 1970, and described in Chapter VI, but the work was carried out by the resident Singapore Engineer Squadron and 54 (FARELF) Support Squadron supervised by 63 CRE (Construction).

Arabian Peninsula

In August 1965, 10 Field Squadron (Airfields) took over from 60 Field Squadron in Aden and the following year was responsible for the extensions necessary at Bayhan airstrip to enable it to be used by Hunter aircraft operating in support of the Aden Protectorate against Yemeni dissidents. With the withdrawal of

all our forces from Aden in 1967, the squadron moved to Sharjah in September, and shortly thereafter was retitled 10 (Gulf) Field Squadron with a troop detached in Bahrain.

At this time a new task was appearing, namely the installation of Rotary Hydraulic Arrester Gear (RHAG) on fighter airfields to guard against overshoot. On landing, an aircraft hook picked up a wire just off the ground across the runway connected through tapes to drums which revolved paddles in water, thereby absorbing the energy and bringing the aircraft safely to rest. The squadron from Sharjah successfully installed one such early example of RHAG at Masirah in 1967. They also carried out other improvements to airfields in the Trucial Oman States and Muscat and Oman.

Libya

The airfield at El Adem in Cyrenaica was in use throughout the 1960s by the RAF as a staging post, and latterly as a station to provide a protective base under the terms of the current treaty between the United Kingdom and Libya. In September 1968, 52 Field Squadron (Airfields) moved to the site to extend the concrete runway and carry out a number of miscellaneous other tasks, including the erection of Twynham huts and assisting in drilling of local wells. The unit was replaced in August the following year by 51 Field Squadron (Airfields) who continued the improvements to the station by constructing further hardstandings and the erection of various Marston and Twynham huts and other facilities for the RAF.

No sooner had this work been completed, however, than on 14 December 1969 the plans for the evacuation of British Forces were announced. These included the recovery of the maximum amount of material from the site so, to their chagrin, 51 Squadron immediately started on the laborious task of dismantling everything they and their predecessors had built. Over the next three months they recovered, almost intact, 85 Twynhams, three Marston sheds and two hangars, a complete Cold Store, two RHAGs installed only two years before by 3 Field Squadron, and some 12,000 sheets of Pierced Steel Plank. In the last stages, joined by a troop from 20 Field Squadron in Cyprus, they also took over the running of the local emergency services and sewage works, before leaving for the United Kingdom on 15 March 1970.

AIRFIELD DAMAGE REPAIR

For some time, it had been apparent that because of their high take-off and landing speeds, high performance aircraft could only fly from long runways possessing accurately levelled, clean and smooth surfaces. Any attack, such as that threatened by the Warsaw Pact air forces, even if it only produced minor surface damage, posed a serious challenge to Western airfields. Expedient repairs that had hitherto been acceptable were no longer adequate in terms of strength, their speed of construction, or the finished surface they provided. The threat was dramatically illustrated when in June 1967 in a period of six hours during the initial stages of the Arab/Israeli war the Israel Air Force gained vital air supremacy by cratering the runways and taxiways of the Egyptian airfields. This operation successfully grounded the Egyptian Air Force thereafter and reinforced the NATO view that a rapid means of rehabilitating airfields was vital. As a matter of some urgency, research was started at MEXE on a wide range of approaches to what was initially called Airfield Emergency Repair, then Rapid Runway Repair, later Airfield Damage Control and eventually Airfield Damage Repair (ADR). The eventual NATO requirement included not only the filling of possible bomb craters, but the repair of other smaller surface "scabs" and the removal of all unwanted debris, including unexploded ordnance, all to be completed within four hours of a conventional attack. The problem was therefore a formidable one and resulted over the next six years or so in a large number of trials[2], both in Germany and the UK by 39 Engineer Regiment (Airfields) units, and the purchase of a quantity of specialized engineer construction plant including wheeled tractors, dump trucks and excavators. The threat was not of course confined only to those airfields used by the RAF and by 1973, largely due to the efforts of RE officers on the staff of SHAPE and Lieutenant Colonel NR Sturt in particular, SACEUR required all the NATO partners to prove they had effective ADR capability in place on their airfields if they were to continue to qualify for infrastructure funding.

As consciousness of the threat grew the urgency of finding satisfactory solutions and allocating adequate resources to the task became a high priority, particularly for the RAF, and the repair of other airfield facilities including fuel supply and power became evident as part of the role. Development of our own

munitions to deny Warsaw Pact airfields was also a natural corollary. The denial of Nicosia airfield during the Turkish invasion of Cyprus in 1974 provided a small but significant opportunity to study the operational effects of such attacks in some detail.

Once 39 Engineer Regiment (Airfields) was concentrated at Waterbeach with RHQ, 51, 52 and 53 Field Squadron (Airfields) and 63 Support Squadron the pursuit of excellence in ADR became easier. There was good interchangeability between squadrons' deployments, but each was affiliated to one of the RAF(G) Airfields - Wildenrath, Bruggen and Gütersloh (later replaced by Laarbruch) - and strong links were rapidly established. Each squadron visited its own designated airfield regularly for CPX and full deployments (Maxevals). Steadily the wide and more technical aspects of airfield damage repair were addressed and fuller use was made of the electrical and mechanical clerks of works and technician officers. The STsRE of the Corps both regular and volunteer took a large part in providing support, particularly in the Bulk Petroleum role, to ensure the RAF could keep flying after an attack on an airfield.[3]

The UK basing of the ADR support for RAF (G) proved less than satisfactory and involved much movement. Although the majority of plant necessary was in light preservation on each airfield its maintenance was a substantial burden and pressure naturally increased for at least one squadron to be in situ. On occasions, whatever Sapper unit was available had to lend a hand to avoid RAF criticism of the Service and, generally, the RAF commanders were most appreciative of the addition to their operational command. Relationships with the PSA who had peacetime responsibility for airfield maintenance were also made much easier at this time by the presence of MES (Works) garrison engineers and clerks of works who were integrated with them.

HARRIER SUPPORT

The concept of vertical take off and landing (VTOL) by aircraft, though not new, came to practical military fruition at the start of this period. Prior to the introduction of the Harrier into service, trials were carried out jointly by the manufacturer (Hawker) and the RE of various materials for use as landing pads, and the

newly developed light alloy airfield mat Prefabricated Surfacing (Aluminium), PS(A), designed by MEXE was selected. By the end of 1970, the RAF had two Harrier squadrons in Germany and at first it was assumed that the engineer support they required when they were operating from forward tactical sites would be provided by neighbouring field squadrons. As the tempo of training increased and the RAF gained experience with their new aircraft, the work load on the Sappers became considerable, including detailed reconnaissances of the large number of possible operational and training sites for landing pads. In 1971 38 Engineer Regiment at Ripon was made responsible for providing Harrier support to the RAF, both for the Allied Command Europe Mobile Force (AMF) and RAF Germany. 11 Field Squadron from the regiment was placed in support of 1 Squadron RAF based at Wittering with an operational role in support of the AMF in Norway, while 32 and 48 Field Squadrons deployed regularly from Ripon to Germany for Harrier support exercises with RAF Squadrons which deployed into the field from Wildenrath. However, the growing importance of ADR due to the increasing threat from the Warsaw Pact led to a requirement for permanent RE support to RAF Germany in peace, so in 1973 10 Field Squadron was established at RAF Laarbruch to fulfil this role and come under 38 Engineer Regiment in war.

By this time it was evident that the fuel consumption (and therefore operating range) of these aircraft was significantly improved if they could take off with a short run rather than vertically and the preparation of such short take off strips became a normal task for field squadrons in support of Harrier operations. Sometimes expedients such as airfield mattings were employed but, where possible, a site would be selected where an existing facility, such as a section of road, could be used. The Royal Navy discovered that the most effective use of Harrier at sea could be obtained by canting the carrier runway up at an angle. The principle of this idea known as the "ski jump" was demonstrated on a ramp built by 38 Engineer Regiment using MGB components at Farnborough at the Society of British Aircraft Constructors' air display in 1978, where it was a major attraction.

Harrier Support exercises were, however, not the only activity of the 38 Engineer Regiment field squadrons designated to the task. Each took its full share of deployments to Belize, Oman and

Northern Ireland together with engineer exercises in Kenya, Canada and elsewhere, though each could also expect at least one month on Harrier support in BAOR of which about two weeks coincided with an RAF exercise. The first ten days of such exercises usually involved the Sappers in hectic site preparation of pads and strips and the construction of hides and fuel bunds, with at least one alternative set of sites for each Harrier Squadron. The exercises normally coincided with the Harrier Force Operational Readiness Tests and once the RAF had finished there was much clearance, lifting of pads and strips and making good to be done. It was quite an education for Sappers to live and work with the RAF in the field and each learnt much from the other as mutual trust built up. In particular, the RAF NBC drills were particularly thorough and the RAF Regiment showed themselves to be a most effective security force as well as providing healthy rivalry in local bars before and after exercises. Comfort levels in the deployment areas with good tentage and centralized messing were relished by soldiers used to the more spartan army conditions normally encountered.

In the early days of Harrier Force exercises the RHQ of 38 Engineer Regiment regularly deployed with the Force HQ together with one or two of its field squadrons (11, 32 and 48). The VTOL sites were almost exclusively in fields with aircraft hides built along the edges of woods. Access problems were often difficult therefore in wet weather, and later on the use of existing roads and more permanent sites in training areas made preparation simpler and the provision and movement of stores less of a burden on RE resources. Hides in urban sites offered better camouflage and would have been used in war, but could not be used on exercises in peacetime because they would have been too disruptive and noisy for the local German community.

There were occasions when Harrier aircraft were deployed outside Europe, for example in Belize and on NATO exercises in Norway, when the affiliated RE supporting detachments accompanied them. Furthermore, on numerous sales drives or demonstrations of the aircraft appropriate RE support formed an integral part, and at the RAF celebration of the Queen's Silver Jubilee at RAF Finningley in 1977 the Corps was well represented at the Harrier stands.

Restructured Command and Control

Under the 1976 Army Restructuring Plan, 38 and 39 Engineer

Regiments were no longer solely responsible for Harrier Support and ADR respectively. In order to increase the flexibility of deployment of units those with a primary role hitherto of support for the RAF were renamed construction squadrons and for the first time reserve army units were tasked with a Harrier support role.

Under the subsequent redeployment, 51 Field Squadron (Construction) moved from Waterbeach to Ripon to join 38 Engineer Regiment, 52 Field Squadron (Construction) moved from Waterbeach to Tidworth to join 22 Engineer Regiment, 53 Field Squadron (Construction) remained in Waterbeach in 39 Engineer Regiment and 10 Field Squadron (Construction) stayed at Laarbruch under HQ BAOR. At the same time two field squadrons from 72 Engineer Regiment (V) were nominated to provide Harrier support in Germany and a new CRE (Airfields) was formed based at Barton Stacey to coordinate all aspects of support to the RAF.

This new balance in the regular UK engineer regiments provided a powerful engineering capability, but raised difficulties in training for the many different roles. The concentration of expertise on ADR and Harrier support matters was now dispersed and there were inevitable inconsistencies in standards and procedures. The establishment of the new Field Squadron (Construction) contained several senior technicians, including garrison engineers, clerks of works and a military plant foreman, artisan tradesmen and 40 plant operators and gave a greatly enhanced peacetime capability, but the wartime roles of each squadron and the RHQ varied widely and were apt to cut across the peacetime chain of command.

72 Engineer Regiment (V)'s involvement in Harrier Support was a considerable challenge for them. The work was manually hard and often dull, particularly as training could seldom be done with the RAF except at camp. It was therefore not popular and the volunteers found it difficult to provide the continuity needed by the RAF who expected few mistakes. The TA could do the job, but it was soon recognized that it was not an ideal role for them and if used they would need assistance from regular Harrier support officers and senior NCOs.

STAR AND D COMMITTEE

For many years it had been appreciated by both the War Office

and the Air Ministry that there were many different agencies looking at particular aspects of the use and construction of airfields, and that it was necessary for as many of the strands to be brought together as possible if effective progress was to be achieved. After World War Two there had been an Aircraft and Airfield Research and Development Committee which had been dissolved in 1957. Its place had been taken by the Forward Airfield Research and Development Committee, which at its first meeting on 29 October 1957 changed its title from "Forward" to "Short Term", giving rise to an acronym familiar for the next twenty years, the "STAR and D" Committee. This committee initially only concerned itself with the design and construction of "short term" airfields for use by tactical transport aircraft. Fighter, ground attack, light bomber and similar categories of aircraft were considered to have requirements which were so stringent that they could only be satisfied by permanent runways. The main purposes of the committee were to coordinate the R and D effort devoted to the solution of problems involved in the design and construction of these short term airfields, to produce criteria for their pavement design, and to attempt to standardize the equipment required in their construction. It was chaired initially by AD/REE/Dev and included representatives from the Admiralty, the War Office, the Air Ministry, the Ministry of Supply, MEXE, SME and the Road Research Laboratory.

Over the next twenty years, various study groups and sub-committees were formed to examine particular aspects. One major achievement was the publishing in 1968 of design criteria, used as base documents thereafter. Latterly, the vulnerability of existing airfields to air attack and development of methods of rapidly repairing runways became a major preoccupation of the committee and from the early 1970s the technical problems posed by the forward deployment of the Harrier were examined. The main STAR and D Committee was eventually disbanded in May 1977, but its sub-committees on Airfield Vulnerability, Harrier Support and Terrain Definition remained in being thereafter.

FOOTNOTES TO CHAPTER IX

1. Operations in Borneo had also generated a need to air-drop plant into inaccessible sites. Brigadier J R E Hamilton-Baillie recalls how he watched the

spectacular drop of a Medium Wheeled Tractor from a Beverley aircraft onto a jungle clearing where a Gurkha Field Squadron was building a strip. Sadly, at the last minute, a gust of wind carried the platform over a steep fall in the ground and the machine ended upside down in the river at the bottom. The Gurkha sapper sitting alongside the brigadier, obviously unimpressed by this demonstration of modern technology, scarcely paused in eating his rice from his mess tin to remark laconically "Ha, gone in river".

2. All manner of suggestions were put forward, particularly in the search for rapid hardening fillers such as quicksetting and sulphur concretes. The main problem was to find a material which could be stored inert near the site for long periods without losing its effectiveness. Another avenue exploited was "Dynamic Compaction" of the debris in the crater using free-fall weights dropped by an excavator rigged as a crane.

3. Nevertheless the difficulties in coordinating the development and implementation of ADR techniques and tactics remained and were not really overcome until later, in particular with the formation of Headquarters 12 Engineer Brigade (ADR) in 1982.

CHAPTER XI

BOMB DISPOSAL

INTRODUCTION - BOMB DISPOSAL - Organization - BD School - Move to Lodge Hill - World War Two Bombs - BEACH CLEARANCE - CLEARANCE OF MAPLIN SANDS - OVERSEAS OPERATIONS - Betio - Penang - Elsewhere - AWARDS - EQUIPMENT.

INTRODUCTION

The period between 1960 and 1980 saw considerable changes, both in the Corps' responsibility for Bomb Disposal, and in its organizations for carrying out this function. These changes arose from a shift in emphasis from the task of clearing the remaining wartime munitions to that of meeting the new threats posed by the Warsaw Pact countries from the air, and terrorist organizations, particularly in Northern Ireland, on the ground.

The first change was the assumption on 2 November 1962 by the Royal Engineers of responsibility for Battle Area Clearance. This had hitherto been carried out by an all-arms unit with seconded officers and NCOs supervising a labour force of searchers, mostly ex Prisoners of War (POW). Much of this labour was transferred to the BD Unit including a number of Ukrainians who had served in the German Army and so could not go home. These men had spent most of their working lives swinging a bomb or mine locator in all sorts of weather over some of the most desolate and exposed locations, in potentially hazardous conditions. To many, their barracks was their only home and it would have been difficult to find a more loyal, friendly and phlegmatic group.

As a result, there were then three clear roles for RE Bomb Disposal:

First, to dispose of any German aircraft bombs outside RN and RAF property or above the high water mark on the sea shore.

Second, to clear any remaining anti-invasion beach mines, anti-tank mines, airfield pipe-mines and bridge charges. This included dealing with land mines washed up on beaches.

Third, to clear redundant Army ranges and training areas, including those which had been handed back for civilian use, but where a change of land utilization caused a requirement for further clearance.

The beach minefields remaining uncleared were mainly in Norfolk on cliff tops, where sea erosion had broken into the perimeter of the minefields. By 1965, the deliberate search for their contents virtually ceased, the role being limited to call-out when mines were washed up. Consequently, it was no longer necessary to have troops permanently deployed on site, such as that at Mundesley.

The following year saw a major review of the Reserve Army. The level of support for Bomb Disposal was no longer considered to be justified and as a result all three BD AER regiments and both BD TA squadrons were disbanded in April 1967. In their place one specialist team, 590 STRE (BD) TAVR, was formed at Fort Clarence, Rochester.

The post-war years of colonial policing by the Army had seen a growing use by terrorists of parcel bombs and booby traps, the former often being a bait for the latter. The divisions of responsibility for dealing with such devices were blurred. Traditionally, Sappers were required to search for and de-louse enemy booby traps; parcel bombs in British territories, however, were dealt with by the police bomb squads, where such existed, and any further individual support to the police was usually given by a seconded RAOC Ammunition Inspector. Events in Aden and Cyprus and the Hong Kong riots of 1968 demonstrated the increasingly sophisticated way in which explosives were used by terrorists and added concern to the authorities. It became obvious that special equipment would be needed to cope efficiently with Improvised Explosive Devices (IED) and this became the subject of a study group which was to lay sound foundations for the requirements in Northern Ireland later on. By the early 1970s it was also apparent that the development of drills and techniques for Search - to uncover concealed terrorist weapons, IEDs and so on - needed co-ordination, and the Corps accepted responsibility for providing advice to all arms on this subject, as is described in greater detail in Chapter IX.

Further changes were stimulated by greater inter-Service co-operation and by working parties, such as the NATO one upon

whose recommendation the traditional term "Bomb Disposal" came to be replaced by the wider title "Explosive Ordnance Disposal (EOD)" in 1969.

The Government announced in 1971 that the third London airport would be built on Maplin Sands, which had been used for many years as a testing range and artillery practice range for Shoeburyness, at the mouth of the Thames estuary. A new squadron, 71 EOD Squadron RE was formed specifically for the purpose of clearing the sands, which it did for the next two years.

By the early 1970s it was appreciated that modern Soviet bomber aircraft could readily reach the UK and the threat from conventional air attack was thereby increased. A properly balanced EOD force was therefore required, not only for the UK, but also for the British Forces in Europe. Consequently both the Regular and Reserve Army strengths were increased, until by 1980 there was an operational RHQ (33 Engineer Regiment) with a Regular EOD Squadron at Chattenden and two Volunteer EOD Squadrons (590 and 591) at Rochester under command.

BOMB DISPOSAL

Organization

In 1960, the Headquarters Bomb Disposal Units (UK) was based at Broadbridge Heath, near Horsham, commanding two operational troops, which were widely spread in small detachments and an electrical and mechanical troop to provide heavy equipment support. The operational work of continuing to dispose of the residue of unexploded bombs was controlled by an experienced BD field officer (major). The Headquarters was responsible for the Army Emergency Reserve BD Cadre, providing control and training for three AER regiments (137, 142 and 144 BD Regiments) and two Territorial BD Squadrons (579 at Chatham and 583 at Dover). Overseas there was a locally enlisted BD Troop attached to 306 ESD in Hong Kong, and a small BD trained British attachment to the Malta Fortress Squadron. A chart showing the title and moves of the various EOD Units in UK over the period 1960-1980 is at Figure 11.

BD School

The Joint Service Bomb Disposal School (JSBDS) which had been formed in 1959 was collocated with the HQ which was

responsible for its support and administration. The School was under technical control of an MOD committee chaired by an officer of HQ E-in-C who sponsored the School on behalf of the Director of Army Training. It became tri-service in 1962 when the Royal Navy joined in full participation of this hitherto Army/ RAF organization, albeit which had accepted RN trainees. Thereafter the School was commanded by each branch of the Service in turn, and was renamed the Defence Explosive Ordnance Disposal School (DEODS) in 1970.

Move to Lodge Hill

Meanwhile, a new purpose-built barracks was under construction at Lodge Hill close to the new barracks for 12 RSME Regiment at Chattenden, for the BD Headquarters, 49 BD Squadron HQ, support elements and for the JSBDS together with display rooms and a bomb museum. Hostel accommodation for the civilian labour of 1 Troop was provided in existing buildings in the old Lodge Hill camp and military BD all ranks lived with 12 RSME Regiment. The move, inevitably complicated, was completed quite smoothly by August 1966. However, the new training area needed much work and development carried on for many years.

World War Two Bombs

The rate of discovery of World War Two bombs did not decline with time; during the 1960s 101 bombs were recovered while 155 were recovered in the 1970s, perhaps reflecting the pace of civil engineering excavations. There were too many actions to record them here in detail; many were most interesting tasks; many placed those concerned in danger. Awards were made of the George Medal to Major G R Fletcher and WO2 S D Hambrook in 1969, and the Queen's Gallantry Medal to Major A S Hogben in 1974.

One incident of this period typified the problems often encountered. It occurred in Sussex during 1969 where the existence of a UXB in very poor soil conditions had been known for a long time. Efforts had been made to clear it in 1941, but abandoned because of the complex shafting problems and the need at the time to get on with more urgent tasks. Captain C E Nicholls commanding 2 Troop of 49 BD Squadron was given the job. After re-locating the bomb, shafting started in August and the case was uncovered five days later, six metres down in

very wet conditions. It was a 250 kg bomb fitted with a clockwork fuze which was not ticking. Normally a stethoscope watch would be maintained constantly on a clockwork fuze, but in this case it was impossible because of the noise of the water pumps which, if stopped, would have allowed the shaft to flood, perhaps collapse. Captain Nicholls, assisted by WO2 Hambrook, immunized the fuze and then removed the bomb base plate to find that part of the filling had become liquid. Some 10 litres of unstable liquid explosive gave off nauseous fumes while the remaining powder explosive floated in lumps or was firmly stuck to the inside of the bomb case. The explosive was removed by hand using a locally made wooden spatula. Working conditions at the bottom of a wet shaft with the noise of pumps, and fumes causing constant retching and nausea were appalling. By the time all explosive had been removed and all was safe, the team had worked continuously for 29 hours. In this case the bomb was in a rural area and there was little difficulty in establishing a cleared danger area. In large cities or towns the problems were more difficult and involved the officer in charge in the extra hazards of dealing with local authorities and services and inevitable pressure from the media.

A TV series made by Thames Television in 1979 *Danger UXB* about the activities of a fictitious RE BD company during the last war stimulated public interest in BD. It also produced a number of calls for investigation, particularly after one episode which showed the anti-personnel "Butterfly Bomb", and resulted in calls from towns and villages in Lancashire, Leicestershire, Lincolnshire, Oxfordshire and Yorkshire as well as many from South East England, all of which had to be followed up.

BEACH CLEARANCE

At the end of 1972 a Type 4 clearance certificate was issued for the last remaining beach minefields at Trimmingham and Mundesley in Norfolk, opening the cliff faces and beaches to the public. This type of certificate made it clear that not all mines laid had been accounted for, but that the areas had been swept and searched a number of times over the years. In fact by 1963, it had been calculated that 937 of the original 1000 mines laid at Trimmingham, Mundesley and Sidestrand had been accounted for. However, during the 1970s a further 93 beach mines were

recovered on the coastline, and 236 anti-tank mines and 15 other mines were recovered in various parts of the country. As manpower could be diverted from beaches to other clearance work, the rate of the latter task was increased. During the 20 year period covered by this volume, well over 21,000 hectares were searched and over 350,000 items disposed of. The main areas at the beginning were Fylingdales in Yorkshire, Orford in Suffolk and the South Downs. Subsequently the work became more widespread as more training areas were released for afforestation and general public use. Despite the effort expended, the outstanding tasks were being added to faster than the clearance could be effected and, by the end of 1980, the area still to be searched stood at 54,706 hectares, an increase of 4,468 hectares over the previous 10 years.

CLEARANCE OF MAPLIN SANDS

When 71 EOD Squadron was formed in July 1971 it had an initial military establishment of four officers and 17 NCOs to supervise the work of locally employed civilian searchers as well as administrative staff, drivers and plant operators. Four NCO posts were temporarily filled by RAF NCOs who had qualified at the DEODS and later, an RN clearance diver was added to help in the recognition of a variety of anti-submarine weapons found. So successful was the integration of this joint Service element, that it was made official on a revised establishment which eventually brought the strength of 71 Squadron to 34 military and 193 civilians.

Work actually started in 1972 and continued for nearly two years until, in 1974, the Government reviewed the project and decided to abandon it. The established part of the labour force, those who had served for over one year, were transferred to 49 Squadron strength, the others were paid off and 71 Squadron disbanded in August 1974.

During the two years a number of areas of sand totalling 450 hectares had been cleared of all items to a depth of 1.5 metres and of larger items to a depth of three metres. 140 hectares of water covered sands had been searched to a depth of 0.4 metres and 63,453 items had been picked up, 14,180 of which were blown up. A magnificent collection of historic items spanning over a century of development was recovered and presented to Service museums. Working conditions were complicated by the

inaccessibility of the area which was tidal, coupled with available hours of daylight. The inshore areas were always accessible, but some of those further out might be available for work for only 20 hours in the month, less in the shorter winter days. The Squadron worked in 16 half-sections (gangs) each of a corporal and seven searchers with, in addition, an excavator and driver to dig where the depth was greater than one metre, essential because of the danger of wet sand collapsing on individuals digging by hand.

Although the proposed airport was never built on Maplin Sands the efforts of 71 Squadron were recognized by the awards of the MBE to the OC, Major R I Radford, and the BEM to Flight Sergeant E K Tumman.

OVERSEAS OPERATIONS

Betio

In addition to the work already described in Chapter VI, in 1963 the Gilbert and Ellice Islands Administration turned once again to HM Government for assistance, this time in clearing the residue of World War Two bombs and shells that presented a hazard to the inhabitants of Betio, in the Tarawa Atoll. This islet had, 20 years previously, been the scene of fierce fighting between US Marines and the Japanese occupying forces; the task was now to collect all the unexploded missiles which still littered the surface, to excavate some 40 bunkers back-filled by the Americans when they left, and to re-inter such human remains as might be found buried in them. With the exception of specified items required for examination and analysis (which would subsequently be destroyed in situ), all explosives recovered were to be dumped at sea in deep water beyond the encircling coral reef.

Following protracted negotiations, a detachment of one officer (Major H P Qualtrough) and one NCO (Sergeant H Cooke) from the Bomb Disposal Unit (UK) reached Betio on 29 November 1965, and began work on 3 December with a party of 15 convicts augmented by locally-employed labourers. By 19 January - although much hindered by rain - all the bunkers had been cleared except one, which had to be abandoned after almost 20 tons of high explosive had been removed from its crumbling depths. In total, 10 tons of missiles were collected on

the ground and 90 tons recovered from below. Using a ship's lifeboat and an outrigger canoe, the dumping process was completed by 30 March 1966, when the RE detachment withdrew, leaving behind them the goodwill of the islanders and a set of detectors with which the police might continue the search. As a result of their work, much of it under hazardous conditions, both Major Qualtrough and Sergeant Cooke were later awarded the George Medal.

The second major clearance of Betio Island had to wait over 10 years until 1977. In that year a Joint Service Team, all EOD trained, took part in an operation covering most of the Gilbert and Ellice Islands. The Royal Engineers were represented by Sergeant J M Devine of 49 EOD Squadron. In all, during this operation Sergeant Devine visited Funafuti, Nanumea, Nanumanga and Vaitupu in the Ellice Islands Group and Betio, Bairiki and Abemama (of R L Stevenson's *Treasure Island* fame) in the Gilbert Island Group.

Penang

In March 1967 a team to rid Penang of its wartime residue of Japanese explosives was despatched from UK. Such were the manpower restrictions that the OC, initially Major A J Loch, was held on RE Depot strength, a Sergeant came from the BD Unit strength, and 12 BD trained junior NCOs and sappers were posted on paper to RE units in FARELF. Administrative back-up plant and vehicles were provided by FARELF and the whole of the BD Team RE (FARELF) ("Bombs Penang" as it came to be called) was under command of CRE FARELF. Accommodation was provided by the resident Gurkha battalion in Menden Barracks, Penang (later to become Penang University) and the Gurkhas, at a later stage in the project, helped with the provision of some labour. As work progressed, a second BD senior NCO was made available and the Far East Fleet produced its Mine and Bomb Disposal Officer with a small RN team when some sea mines and torpedoes were uncovered.

As at Betio, the main method of disposal of the explosives was by sea dumping since there was no demolition ground with a big enough safety area on Penang. 10 Port Operating Squadron RCT, which still included a number of ex-Sappers, provided a Uniflote to act as a jetty for loading the RCT operated LCT used for the dumping. As far as possible, bombs were dumped on the same day that they were finally uncovered to limit the

temperature change which tended to cause exudation of the deteriorating explosive content.

The original team was replaced during the months March, April and May 1968, Major M J V Hoskins taking over from Major Loch. The whole task took two years to complete and provided an excellent example of a worthwhile detachment project. Over 2,500 aircraft bombs ranging from 60 to 500 kg size were disposed of, as well as some 250 tons of various other explosive devices, including German anti-aircraft shells. Most of these were buried deep under collapsed tunnels and the task, described at one stage as 80% digging and 20% disposing, had much in common with the more traditional BD procedures of locating, digging and then finally dealing with the UXB. While in the Far East, Major Hoskins was called to Borneo where he dealt with several UXBs from the Confrontation campaign, and was awarded the George Medal for that task. Two senior NCOs, Staff Sergeant J C V Wood, later killed in Northern Ireland, and Sergeant G Duncan, were awarded the BEM. A number of those involved in handling the deteriorating explosives suffered skin damage to the extent that at least one of the team was eventually invalided out of the Army. An attempt to obtain an issue of the General Service Medal with a "Bombs Penang" clasp in similar style to the beach minefield award, was turned down by the MOD.

Elsewhere

Other detachments from the Royal Engineers bomb disposal organization were also working well away from the British countryside. These included Sardinia 1970, Cyprus 1973 and 1974, Malta 1974, the Falkland Islands 1975, West Germany 1969-78, the Solomon Islands 1978, and Jersey 1979. Most tasks were ones which enabled a small detachment under either a junior officer or senior non-commissioned officer to demonstrate not only their EOD skills, but the general versatility of a small Sapper detachment many miles from its base.

AWARDS

Some of the awards given during this period have been referred to in the text, but there were many others and these, won during operational campaigns, are included in the list at Annex B.

EQUIPMENT

With the advances in technology and changes in certain RE responsibilities in EOD, came the need for new equipments. In 1960 many items had remained largely unchanged since World War Two, and over the next 20 years improvements concentrated mainly in the areas of faster shaft construction, increased location capability, and improved trepanning and fuze neutralization equipment. A Table giving brief details of the EOD equipment in service over this period is at Table 7.

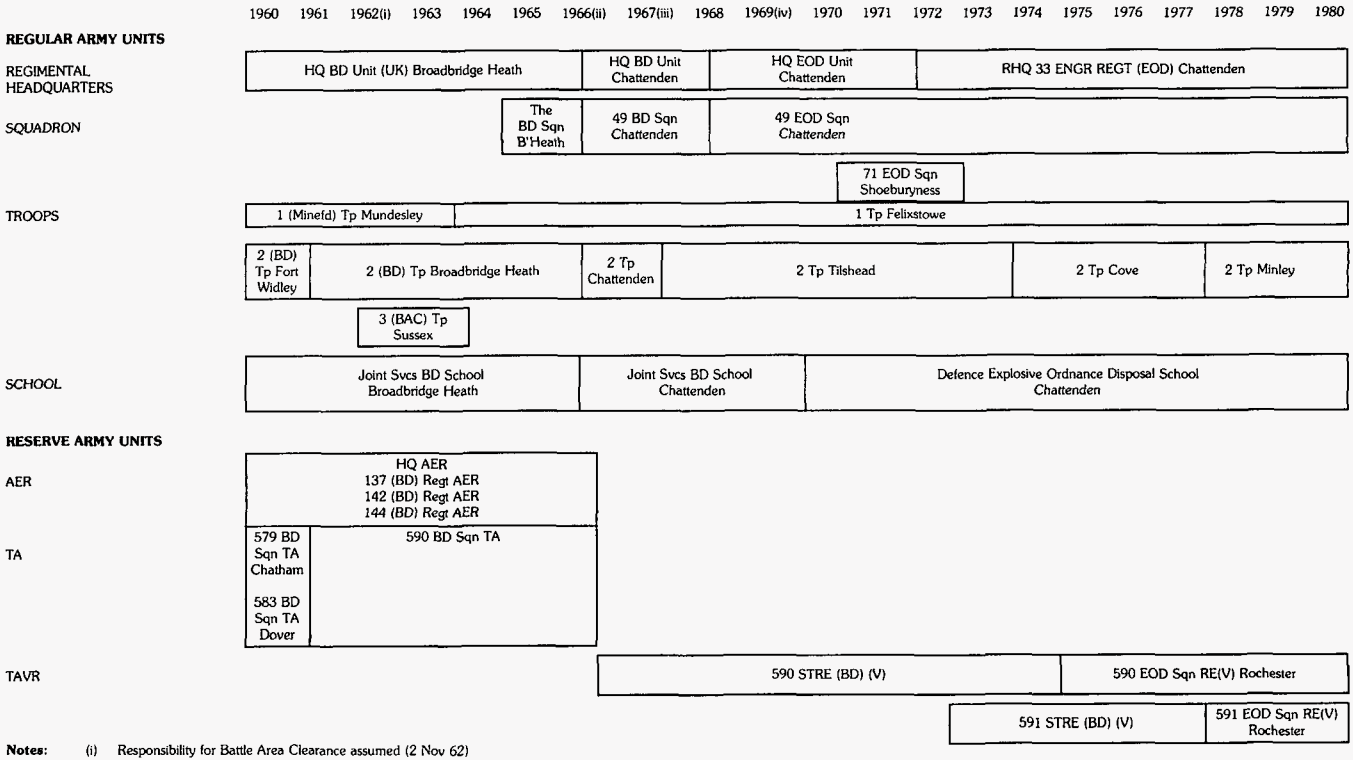
TABLE 7 RE BOMB DISPOSAL EQUIPMENT IN SERVICE 1960-1980

PURPOSE	EQUIPMENT	PARTICULARS
(a)	*(b)*	*(c)*
Personal Protection	EOD CBR Suit	Designed to wear over standard NBC suit and respirator.
Bomb Location	Forster Locator 4015	For detection of ferrous objects buried to depth of 3 to 5 metres. Battery operated probe, amplifier and indicator, weighing 7 kilograms.
	Forster Locator 4016	Underwater and borehole version of above.
	Proline Earth Auger	Power operated auger for drilling holes 115 millimetres in diameter, driven by 7 HP single cylinder Wisconsin engine, to max depth of 18 metres.
Bomb Access	Hands England Drilling Rig	Truck mounted auger to drill holes 120 millimetres in diameter to a depth of 30.5 metres at about 1.5 metres per minute.
	Metal Ring Shafting	Set of 7 telescopic aluminium rings from 1.6 metres to 2.2 metres diameter each 1 metre long, producing 7 metre deep shaft.

TABLE 7 (contd)

(a)	(b)	(c)
Fuze Neutralization	Magnetic Clock-stopper Mk 3	To prevent movement of a clockwork fuze, using 24 volt battery operated electromagnet weighing 81.6 kilograms.
	Fuze Type 'S' Mks 1 to 3	To apply appropriate liquid neutralizing agent to render fuzing components of bombs harmless.
Fuze Detection	Stethoscope Electronic	Portable equipment to detect and amplify any sounds (eg clockwork mechanism) originating within explosive ordnance.
Fuze Extraction	Fuze extractors	Various devices to remove bomb fuzes remotely; including a pneumatic jack operated by carbon dioxide for transverse fuzes (Freddie) and a cable operated ratchet (Igol) for nose fuzes.
Bomb Case Penetration	EOD No 5 Mk 1 Trepanner	Non-ferrous rotary trepanner for cutting 111 millimetre diameter holes through bomb cases using compressed air or wet steam.
Bomb Filling Removal	Kismet Heavy Duty Equipment	Steam generating plant on 1 ton trailer chassis Powered by Villiers petrol engine, to steam out bomb high explosive main filling.

FIGURE 11 - CHART SHOWING TITLES AND MOVES OF EOD UNITS 1960 - 1980



Notes:
(i) Responsibility for Battle Area Clearance assumed (2 Nov 62)
(ii) Move of BD from Broadbridge Heath to Chattenden (Aug 66)
(iii) Disbandment of TA and AER
(iv) Adoption of Nato nomenclature "EOD" in place of "BD" (1969)

CHAPTER XII

SURVEY

INTRODUCTION - THE UNITED KINGDOM - The Directorate - Headquarters - Deployments - Map Production - Map Distribution - GERMANY - Headquarters - Deployments - Map Production - Map Distribution - Map Production Equipment - THE ARABIAN PENINSULA - Headquarters - Deployments - Map Production - Map Distribution - CYPRUS - Headquarters - Deployments - THE FAR EAST - Headquarters - Deployments - Map Production - Map Distribution - SATELLITE GEODESY - EXPEDITIONS - BOUNDARY COMMISSIONS

INTRODUCTION

In parallel with their Sapper counterparts elsewhere, at the start of this period units of the Survey branch of the Royal Engineers were engaged in all the major operational theatres. However by 1980, as a result of the general withdrawals from these areas, the majority of units from the Far, Middle and Near East had been disbanded or had returned to the United Kingdom. But, because of their high international reputation, a number of units and individuals continued to be employed during this period in circumstances not directly related to military operations and, as we shall see, were called upon from time to time to contribute to the resolution of international boundary disputes, to undertake survey of unmapped regions and to participate in international geodetic survey programmes.

The period also saw the introduction of two survey systems which were to revolutionize field survey operations. One, based on the recently invented Tellurometer, which used timed electromagnetic pulses to measure distances, enabled surveys to be carried out in a fraction of the time classical methods would require. The other, based on the use of earth-launched satellites, provided a means of fixing positions of widely separated points on the earth's surface in terms of a global geodetic system.

THE UNITED KINGDOM

The Directorate

Following a reorganization in 1956 the Directorate of Military Survey moved to Feltham in 1962. Liaison officers from the US

Army Map Service and the US Aeronautical Chart and Information Centre were accredited to the Directorate to assist in co-ordinating joint worldwide map and aeronautical chart production programmes and the Joint Advisory Survey Board, which had been formed in 1947, continued to co-ordinate the interests of Military Survey, Ordnance Survey, the Directorate of Overseas Surveys and the Hydrographer of the Royal Navy. With the introduction of satellite geodesy, described later, a new branch was added in 1962 to the directorate with special responsibilities for co-ordinating joint UK-US satellite geodesy programmes and field and geodetic survey programmes.

A further reorganization took place in 1974 and, following the decision that the secondment of serving Royal Engineer officers to the Ordnance Survey should be phased out, the post of Directorate of Military Survey was upgraded to major general and the post of Deputy Director upgraded to brigadier and redesignated Brigadier (Survey). In order to reflect the Director's Charter the Directorate was structured as follows:

Survey 1. Manpower, establishments, manning, security, in-service equipment, accommodation, training, mobilization, employment testing, publications, visits.

Survey 2. Land map production, aeronautical chart production, map and aeronautical chart storage and distribution.

Survey 3. Procurement of maps and survey information, air photography and technical control of air survey liaison staff UK.

Survey 4. Research and development, general staff targets, general staff requirements, trials.

Survey 6. Staff control of field surveys and satellite geodesy.

Several minor changes were implemented later as part of the Army Restructuring Plan, and the Director of Military Survey agreed to accept responsibility for map reading training throughout the Army. It was eminently logical that those who

made maps should teach others how to use them and also to learn from the users how geographic products generally could be adapted to meet developing operational requirements.

Headquarters

Following the formation of Army Strategic Command in 1968, a small survey branch headed by a Deputy Assistant Director was established in the headquarters. There were no Military Survey units under its command, but support was provided by 42 Survey Engineer Regiment which had returned to UK in 1963 and was under the functional control of the Ministry of Defence. On the formation of Headquarters United Kingdom Land Forces in 1972, the Survey Branch assumed functional control of the regiment and 135 Field Survey Squadron (V), and the headquarters post was upgraded to Assistant Director.

In addition to its normal survey staff responsibilities, particularly in the identification of geographic support for contingency plans and also with the mapping of Northern Ireland, the branch sponsored UK trials for the Tactical Information Printing System (TACIPRINT) which had been devised in BAOR, and was involved in the production of numerous special maps to support operations, trials and exercises. However, following the 1975 Defence Review, the branch was reduced to one warrant officer, and 42 Survey Engineer Regiment and 135 Field Survey Squadron became MOD controlled units.

Deployments

In 1960, the Military Survey units located in the United Kingdom were as follows:

13 Field Survey Squadron located at Haslemere.
8 Field Survey Map Depot at Ascot.
The Survey Liaison Staff (UK) at RAF Wyton.
The Photogrammetric Section of the Joint Air Reconnaissance Intelligence Centre at Brampton.
The Survey Production Centre, redesignated in 1962 as the Mapping and Charting Establishment at Feltham.
The School of Military Survey at Hermitage.
135 Field Survey Squadron (V) at Ewell.

Initially, 13 Squadron provided the main field survey support

in the UK, and its tasks included surveys for Thor missile sites and various navigation systems for both the Royal Navy and Royal Air Force. It moved to Aden in 1964 and returned four years later to continue a wide variety of tasks all over the world, including Australia, Nova Scotia, Jamaica, the Gulf and Germany. Meanwhile, 42 Survey Engineer Regiment moved from Cyprus to Barton Stacey in June 1963 and by the following January consisted of 19 Topographic Squadron, 22 Lithographic Squadron and 47 Cartographic Squadron.

Within a month of its return from Aden, 19 Squadron deployed a troop to Borneo to assist 84 Survey Squadron and this commitment remained until February 1965. Another troop was deployed in March 1965 to Aden to assist 13 Field Survey Squadron and this, too, continued until April 1966. Meanwhile, a further troop was deployed to Norway during July and August 1965 to establish control for new mapping, and gravity surveys were undertaken in collaboration with the Royal Navy in and near Gibraltar and at ports in Scotland, Northern Ireland and England. For the next two years, much work was done in a joint programme with the Ordnance Survey to check the scale of the national primary triangulation of Great Britain using Tellurometers, and this continued until April 1967.

In March 1968, 13 Field Survey Squadron returned from Aden and was collocated with 42 Survey Engineer Regiment at Barton Stacey; but from June to November a troop was employed in Western Australia and the Northern Territories on levelling and altimetry for mapping control. The squadron also carried out the unusual task of providing a mesh of some 23,000 heighted points on the main runway at Fairford to assist in the analysis of vibrations which had been detected during the Concorde aircraft's taxiing trials. Meanwhile, 19 Squadron provided field parties for a boundary survey in Libya, an airfield survey in Cyprus and a levelling task in Malta. In July 1968, 47 Cartographic Squadron was deployed to Norway on the first Exercise Carto Norge as a forerunner for subsequent annual exercises aimed at producing standard 1:50,000 maps of NATO's northern flank.

The following year 13 Squadron provided a detachment from April to October in Nova Scotia and 19 Squadron deployed detachments in Malta and Libya. Also during the year observations and investigations of gravity anomalies continued in north western Scotland[1] and the Outer Hebrides[2]. Other tasks

included surveys of RAF airfields, the calibration of a torpedo range and the revision of maps of Castle Martin range. In 1970, a survey of all obstructions to low flying by objects over 200 feet high throughout the UK was begun by 13 Squadron, and by the end of the year England and Wales had been completed and much of Scotland reconnoitred. A troop of 19 Squadron was deployed in New Guinea from July to December and 13 Squadron provided a small detachment to establish height control in Borneo. From December 1970 to April 1971 a detachment from 19 Squadron went to the West Indies to carry out gravity surveys in the Bahamas and in Trinidad and Tobago.

During 1971, overseas deployments continued to Australia to provide control for a photogrammetric range at Bonegilla, to Jamaica to produce a new training area map, to the West Indies for various duties and to Abu Dhabi and Bahrain to observe astronomical azimuths. Meanwhile, at home, the survey of obstructions to low flying was completed. Over 100 previously uncharted obstructions were located and the task had involved 59,000 miles of road travel and 218 flying hours. In 1972, at the time of the formation of United Kingdom Land Forces (UKLF), 42 Survey Engineer Regiment reorganized to incorporate 13 Field Survey Squadron; and 47 Cartographic Squadron was amalgamated with 22 Lithographic Squadron to form 22 Map Production Squadron. Early in the year, 13 Squadron provided a detachment of field surveyors for the Persian Gulf. While there they had the unpleasant task of recovering the bodies of some 130 people from a Scandinavian airliner which had crashed in their operational area.

On 1 January 1973, 19 Topographic Squadron was redesignated 19 Geodetic Squadron to reflect the change in emphasis of their work. A troop from the squadron returned to Australia for three months to continue a survey of the Lake Hume photogrammetric range, and during May and June virtually the whole Squadron was deployed in North Wales carrying out control surveys in collaboration with the Ordnance Survey. Their tasks included a survey to aid archaeological field work by Bangor University. Elsewhere gravity surveys were carried out on the Isle of Wight and a survey of Maplin Sands (then considered a possible airport site) was carried out. Thereafter, for the remainder of the period, the pattern continued in similar vein, with detachments working in Cyprus, Kenya, Norway and elsewhere. Large scale surveys were

undertaken for various construction projects, surveys of ranges and training areas were completed and the fixation of a North Sea drilling platform which had been carried out by a civilian contractor was monitored on behalf of the Department of Energy in 1975.

Following earlier work undertaken in the monitoring of position fixing in the North Sea, Royal Engineer Survey expertise was again provided at the request of the Department of Energy at consultative meetings with both Norway and Denmark during 1976. In 1979 a joint reconnaissance with Section Géographique Militaire and the Institute Géographique National of France was carried out with a view to establishing a geodetic connection between the Channel Islands and France, and this was duly completed in 1980 through preliminary surveys in Guernsey and adjacent islands, and for this project valuable support was provided by 135 Field Survey Squadron (V).

The Joint Air Reconnaissance Intelligence Centre (JARIC) which had moved to Brampton in 1957 had a joint service role and although predominantly a Royal Air Force Unit, was manned by personnel of all three Services and scientific and administrative grades of the Civil Service. The Centre was primarily concerned with the exploitation of aerial imagery for the three Services although it also provided information for Town and Country planning, pollution studies, accident and disaster investigations and even assisted in the search for the Loch Ness Monster. In January 1960, the Photogrammetric Section was established within JARIC with an initial strength of one officer (major) and 11 soldiers, who were mainly air surveyors but, by 1965, reflecting the introduction of more advanced equipment, the section's strength had increased to 25 all ranks and its title was changed to Technical Services Squadron. Following the acquisition of a new computer in 1972, which further extended the unit's capabilities, the Squadron continued to expand to a strength of two officers and 30 soldiers and civilians.

Personnel of the Survey Liaison Staff (UK) were collocated with the RAF Photo Reconnaissance Squadrons and their tasks were to prepare detailed flight plans for all survey photographic missions mounted from the United Kingdom, to brief and debrief aircrew and to assess results. Detachments were sent to the Far East to obtain photography of Malaya, Thailand, Borneo and Hong Kong. Photography of parts of East Africa was

obtained in the period 1959-61 and also the Home Counties of England. During 1962 and 1963 photography of British Guiana, the Solomon Islands and the New Hebrides was also flown. In 1963 the unit's strength was increased to one officer and 14 soldiers and in the following year a detachment was back in Africa to fly photography of Rhodesia, Zambia and parts of Bechuanaland. Later that year a further visit to the Caribbean was made to complete the photographic cover of British Guiana. In 1968 assistance was given to the Ministry of Housing and Local Government to assess the extent of flooding in south east England. In 1969 planning was carried out for large scale photography of eleven towns in Northern Ireland. Other major tasks during this period included work in Denmark and parts of Norway, where polyester film was used for the first time.

In 1971, the title of the unit was changed to 6 Air Survey Liaison Section and its strength reduced to one officer and six soldiers. Survey photography of Borneo was flown and also of the Seychelles, Norway, the Channel Islands and parts of Northern Ireland. In 1972 the unit's responsibilities were increased to include the assessment, plotting and recording of all photography flown by the Hydrographic Department of the Royal Navy. A detachment was sent to the Caribbean to obtain survey photography of Bahamas, Barbados, Dominica and St Vincent, followed by more missions to Denmark and Norway. In 1973 and 1974 photography was obtained of Fiji, the Solomon Islands, the Ellis Islands, Singapore, Brunei, Northern Ireland, Denmark, Norway and parts of the Federal Republic of Germany.

A major detachment was sent to the West Indies in 1975 and small tasks included cover of Hong Kong, Oman, parts of Kenya, Brunei and the United Kingdom. In 1976 and 1977 photography of the remaining parts of the United Kingdom was obtained and small areas of Norway, Kenya and Belize were covered. The first phase of a three year programme covering Denmark was completed during 1977. In 1977 1 Air Survey Liaison Section returned from Malta and 6 Section was consequently disbanded the following year.

Map Production

The bulk of the cartographic and printing work required in the production of aeronautical charts and land maps was undertaken by the Mapping and Charting Establishment, a large

static unit located at Feltham and manned mostly by civilians. Maps of Great Britain were produced by the Ordnance Survey and overprinted to meet military requirements. Similarly, in Northern Ireland standard mapping was produced by the Ordnance Survey of Northern Ireland.

Until the return from Cyprus in 1963 of 42 Survey Engineer Regiment the only other map production facility had been at 13 Field Survey Squadron which held a complete set of vehicle-mounted equipment. Other equipment existed at the School of Military Survey and at 135 Field Survey Squadron (V), but these units were committed to training. Once back in England, 22 Squadron was reorganized on a two troop basis with one troop to operate the large static equipment and the second troop as a mobile troop with a train of six prime movers and semi-trailers. During 1964-66 most of the static capacity was employed on routine reprinting of standard series mapping to provide and replenish depot stocks while the mobile troop deployed on exercises, demonstrations and exhibitions.

When 13 Squadron returned from Aden in 1967, 22 Squadron handed over its mobile equipment to them and concentrated on the static equipment. In 1969 three new Crabtree Countess double colour printing machines were installed in 22 Squadron and in the same year 47 Squadron produced a 1:25,000 map of Mjølfjell, the end product of the first Carto Norge exercise. This was the start of many years work on the production of standard operational maps of Norway. Also in 1969 a map of the Libya training area, a photomap of Abu Dhabi, a pictorial map of the Buraimi Oasis and air survey plots of Simian and Cayman Brac were produced, the last two for the Military Works Force.

In 1970 an extensive production programme of Northern Ireland town plans was taken up which was extended during subsequent years: Ballymena, Bangor and Larne maps were all revised. The Lisburn sheet and several others were produced at scale 1:20,000 and in 1974 work started on a new 1:250,000 scale road map of Northern Ireland. However during the period 1970-74 work was not entirely confined to Northern Ireland and other products included revised maps of British Honduras, Malta, and new maps of Bahrain. In 1972 the map of Anguilla was revised and work was carried out on a number of sheets of the Hong Kong 1:25,000. In 1973 new maps of several United Kingdom training areas were produced.

Meanwhile, 13 Squadron's mobile training was overhauled during 1971-72 and the Squadron was able to participate in exercises in the United Kingdom and in the Federal Republic of Germany. In 1973 it joined 14 Squadron and 135 Squadron (V) on Exercise Barletta in Rheinland Pfalz. Among other things the exercise was designed to test a new concept in rapid map revision but it also revealed that the days of the then current range of mobile equipment were numbered.

Production effort continued to be dedicated to large scale maps of Northern Ireland, to aeronautical charts and to the moving map display films used in the navigation systems of the Harrier and Jaguar aircraft. Following a review of priorities in 1976 resources were transferred from several standard world series maps and aeronautical charts to meet increasing demands for digital topographic data. Although the demand for conventional maps was increasing, such maps, whilst well adapted to the human map reader, could not be read by computers. The development of intelligent weapons systems generated a requirement for geographic information presented in a form which could be read by computers for real time response, for example in on-board missile guidance systems. Studies were also initiated into the feasibility of using single data sets to generate a variety of cartographic products at different scales. The first aeronautical charts generated from digitized data were produced in 1977 and experimental land maps at different scales were also produced in the same way. There was thus a clearly established trend towards digital data bases, but their production in sufficient quantity to cover all the likely areas of operational interest was an enormous undertaking and required agreement over specification between the participating NATO nations. This placed a heavy workload on the Directorate, not helped by the demise of the Survey Branch in HQ UKLF. A moratorium on Defence expenditure at the critical moment also prevented the acquisition of essential automated cartographic equipment, but the way ahead for the next decade had been clearly identified.

Map Distribution

8 Field Survey Map Depot was responsible for holding and maintaining bulk stocks of maps, aeronautical charts and associated survey data, and for issuing maps to overseas depots, to units of the three Services, to government departments and to

specified international organizations. Early in 1957 preparations had started for the move of the Depot from Ascot to Guildford, but the move did not take place until early 1961. Although command was exercised from Guildford on 10 January 1961, the task of moving, indexing and stacking some 50 million maps could not be completed until October. In addition to the work directly associated with the move and rationalization of stocks, sixteen mobilization stores were established throughout the country at the same time, and aircraft carriers of the Royal Navy had to be mapped up to meet the scheduled conversion dates for the introduction of the Universal Transverse Mercator grid.

In 1962 the unit was redesignated 8 War Office Map Depot, and the following year the Depot received considerable stocks of maps from the Middle East and Near East consequent upon reorganizations in those theatres. In 1964 the title was again changed, this time to 8 Map and Air Chart Depot.

Following the establishment of United Kingdom Land Forces in 1972, it was decided that map stocks required to meet UKLF commitments would be better located at Barton Stacey and the UKLF Reserve Map Store was established with 42 Survey Engineer Regiment. This was followed in late 1973 and early 1974 by the movement of contingency reserve map stocks for the Army from 8 Depot to the Reserve Map Store. A similar operation for Royal Air Force contingency reserves was carried out in September 1974 when stocks were moved from 8 Depot to the Strike Command Map Store.

Throughout the period stocks were returned from abroad as depots and map stores closed. Various reviews were carried out over the years with the aim of reducing the number of maps and aeronautical chart series held and also of the stocks of each sheet in each series. The production of laminated maps to reduce wastage was introduced initially for use in Northern Ireland, but provided a popular innovation which was later extended to Belize and certain training areas.

GERMANY

Headquarters

In December 1959 Survey Branch Headquarters Northern Army Group/British Army of the Rhine was divided into Survey Branch Headquarters Northern Army Group/2 Allied Tactical Air Force (HQ NORTHAG/TWOATAF) and the Survey Branch

Headquarters British Army of the Rhine/Royal Air Force (Germany) (HQ BAOR/RAF(G)). The Assistant Director Survey and a German officer formed the nucleus of Survey Branch HQ NORTHAG/TWOATAF which was responsible for exercising technical direction of all Survey/geographic units assigned to NORTHAG, while Survey Branch HQ BAOR consisted of a Deputy Assistant Director Survey and four soldiers, and was responsible for exercising technical direction of British Military Survey units in BAOR. This separation of functions enabled clear distinctions to be made between NATO and national responsibilities. Over the next five years both senior posts were upgraded to full colonel and lieutenant colonel respectively.

Until 1968 there was no Military Survey staff representation at Headquarters 1 British Corps (HQ 1 (BR) Corps). For the various exercises in the Winter Sales series Assistant Director Survey HQ BAOR moved to HQ 1 (BR) Corps to set up a small survey cell at Rear Headquarters, leaving the Staff Captain to manage survey affairs at what became Headquarters British Logistic Support Command (HQ BRLSC). However, early in 1968 HQ 1 (BR) Corps agreed to a six-month trial attachment of a survey officer as a Deputy Assistant Director. The trial was a success and the post was established later in the year, together with a sergeant cartographic technician post. In 1973 an attachment of a staff sergeant survey technician was arranged with the British Commanders-in-Chief Mission (BRIXMIS) in Berlin and the post was occupied in the following year.

Deployments

The survey units stationed in Germany in 1960 consisted of:

14 Field Survey Squadon, in Tela Barracks[3], Ratingen from 1964 onwards.

The Survey Production Centre (BAOR) in Nicholson Barracks, Mönchengladbach.

3 BAOR Map Depot, located at Ratingen whence it had moved from Bielefeld in 1961.

At the start of this period, the work of 14 Field Survey Squadron was concentrated on field surveys for missile sites, a revision of maps of West Berlin and several large scale site

surveys. In 1963 and 1964 field revision of certain sheets of the 1:100,000 maps of Germany was undertaken and surveys for Instrument Landing Systems (ILS) were taken up and completed in the following year. In 1966 this work continued with surveys for instrument calibration sites and a number of border surveys for the British Frontier Service. Air surveys were made of potential bridge sites and the revision of a number of town maps started in 1965 and continued through 1966. During the next two years extensive work was done on the recovery and description of triangulation stations and by the end of 1968 some 1680 stations had been documented.

Thereafter, a programme of fixing control points at 2000 metre intervals over the area of three 1:50,000 map sheets was carried out for the selection of sites for surface to air missiles. Other field work included the revision of the Soltau-Luneberg training area map and the production of a map of the Achmer training area. In 1970, surveys were carried out for inertial navigation systems (INAS) and a related programme was started for the production of large scale plans of airfields. A major task in 1971 involved field work for the production of seven sheets of 1:50,000 cross country movement maps. Work also continued on the provision of control points at 2000 metre intervals over a further two 1:50,000 scale map sheets. The task was extended in 1972 and other field tasks included large scale surveys in Berlin and surveys for a 1:2,500 plan of an area at Bracht. The same year, an unusual task was to provide survey support for Exercise Firefly, a trial on the Hohne ranges designed to evaluate the use of helicopters in the anti-tank role at night, and for which 14 Squadron was joined by a troop from 42 Survey Engineer Regiment in England. The survey work included the determination of spatial co-ordinates of artillery flares using synchronized cameras. Other tasks included the preparation of large scale airfield plans and an orienteering map.

In 1973 the major field work tasks were surveys for cross country movement maps and a further two map sheets' worth of high density control for artillery use. Smaller tasks included surveys for navigation aids and instrument calibration sites. Terrain evaluation from air photographs was taken up in certain areas and the Bracht large scale plan was completed. During 1974 most field work was concerned with large scale plans, map revision and navigation aid surveys.

This pattern of work continued in 1975 with surveys for

instrument calibration sites, radio antennae and revision of maps of the Soltau-Luneberg training area. Several large scale surveys were undertaken at the request of the Property Services Agency. In 1976 work was taken up on checking power lines for the low flying aeronautical chart series and more aircraft heading alignments were surveyed. Large scale survey tasks were carried out at a number of sites and photogrammetric tasks included revision of airfield plans, training area maps, and the preparation of revision information for standard mapping. The power line surveys continued in 1977 and a number of checks were applied to airfield surveys. Surveys for several trials were carried out and survey support was provided for 512 Specialist Team for satellite tracking operations.

The surveying of obstructions to low flying was a very large task which continued through the next three years, though the requirements for surveys for instrument calibration, radio antenna alignments, site surveys and the processing of map and aeronautical chart revision information continued. Finally, in 1980, the need for surveyors at divisional level was recognized by the provision of a terrain analysis section of two surveyors to each armoured division headquarters.

In addition to all the work above for the British armed services, over much of this period large survey exercises were held every second year involving troops from many NATO nations including Britain, Germany, Holland, Belgium and the UK, in which Reserve units also participated. The exercises included a "Mini-Olympic" sports day which greatly fostered international relations.

Map Production

The general pattern of map production in Germany throughout this period was for the Survey Production Centre (BAOR) to undertake the main bulk printing and reprinting programmes thus allowing 14 Squadron to carry out the smaller rapid response tasks and any highly classified ones. Initially, the majority of the work was concentrated on production of 1:50,000, 1:100,000 and 1:125,000 scale maps of areas of operational interest.

By 1964, a specification for the Cross Country Movement series had been approved and work started on production. The prototype of a new series of 1:50,000 road and bridge maps was also approved at NATO level and work was taken up on this

series. There was also a new requirement for closed circuit television briefing maps for use by Corps headquarters.

Meanwhile, at the Survey Production Centre, output rates in the order of 18 million printing impressions were achieved, but this was below the equipment's capacity because of shortages of technicians. In 1967 the RAOC Printing Section in Bielefeld which had been carrying out non-survey print work was disbanded and its commitments accepted by the Survey Production Centre, with adjustments to its establishment, resulting in a significantly increased overall output. In 1968 major tasks included the completion of the 1:50,000 scale road and bridge series maps and the production of a new 1:100,000 scale wall map. Work continued on 1:500,000 scale low flying aeronautical charts and a new series of town maps was taken up and completed in 1970. A new BAOR road map at 1:500,000 scale was produced, some 63 different sheets of the standard 1:50,000 scale series, and new 1:100,000 scale closed circuit television maps comprising 23 sheets were also all produced by the end of 1970. However, by this time difficulties in the allocation of resources between conflicting operational and logistic requirements had emerged and the RAOC section was reformed in 1971. The capacity for survey work was thus increased and in 1972 survey printing reached 28.3 million impressions, the highest for several years.

At the request of RAF (G) some interesting design studies were conducted for low flying charts at scale 1:250,000 covering the Central Region. There were a number of considerations; the night low flying air traffic control system was different from the day system, helicopter pilots wanted all place names shown, high speed jet crews wanted an uncluttered chart showing only topographic features, and because new editions would be required every few months the charts had to be economical to produce and easy to maintain. After several trials it was agreed to produce the charts in two versions, one showing the day system, the other its night equivalent.

Map Distribution

By the end of 1959 the turnover at 3 Army Field Survey Depot averaged some 840,000 map sheets per month. Late in 1960 the deport was reorganized to separate its national and NATO functions; the main component at Bielefeld became responsible for national stocks and another component at Herentals became

responsible for the NORTHAG/TWOATAF reserves. Following revised stock holding policies the monthly turnover then rose to an average of 1.6 million sheets in 1960 and 1961 and for the remainder of the period, because of continual revisions, the turnover seldom fell much below this figure.

Map Production Equipment

In 1961 14 Squadron received the prototype printing and platemaking vehicles of the postwar range of mobile equipment which had been under development for a number of years. These were followed in 1962 by production models of the printing vehicle and the graining/guillotine vehicle and in the following year the camera and darkroom vehicles, thus providing a complete mobile train of vehicles for map production. The vehicles were very large towed semi-trailers, some of which had expanding sides: the camera and darkroom vehicles were designed to be placed next to each other with lightproof connecting doors. Power was supplied from 27 kVA towed generators. In addition to the map production vehicles two specially fitted 3-ton computing vehicles were received for deployment with the field survey troops.

For the next ten years this mobile map production train of eight heavy articulated vehicles was deployed on all major exercises, but the vehicles were embarrassingly slow when on the move, had to be parked on hard standings, and had to be level to ensure that processing liquids could be properly controlled during printing operations. Because the vehicles could not be easily reversed, particularly at night, sites had to have traffic circuits. There were thus several constraints on their tactical deployment and due to their size the vehicles could not be easily camouflaged. On one occasion several semi-trailers had been refurbished in workshops after a tour in the Middle East and were about to go on exercise with their roofs still painted white. They were spotted by chance from a second storey window just in time and a potentially extremely embarrassing situation narrowly avoided.

Thus it was becoming increasingly apparent that the vehicles were unacceptable tactically in the combat zone, where nevertheless fresh maps and overprints were constantly required. Ideally production of graphics had to be with the formation concerned, with processing carried out in not more than one vehicle of a size and performance comparable with

others in the formation headquarters. Production rates were specified to be in the order of 1000 copies of a tactical map in two hours. As a solution it was suggested that if transparent sections of the standard maps were made, butt-joined to cover any area of interest, their tactical information could be compiled on a separate transparent foil, placed in contact with the base map sections and contact printed on to a printing plate. This plate could then be used to print as many copies of the tactical information map as were required.

14 Squadron already had a small Rotaprint machine and various ancillary items. A cardboard mock-up was constructed on the floor of the Squadron's garage to locate the internal arrangements for a vehicle and a tour of the local RAOC Disposals Park located a standard 3-ton box body lorry which had been declared beyond economical repair for no obvious reason. Authority was obtained to get the vehicle brought back into service, repaired and fitted out using the mock-up as a guide. It was then deployed on exercise and the concept was well received. The system was strongly supported by BAOR, formally staffed through the Ministry of Defence and purpose-built containers to fit on standard 3-ton vehicles were taken into service under the title Tactical Information Printing System (TACIPRINT) some five years later.

THE ARABIAN PENINSULA

Headquarters

Early in 1961 Headquarters British Forces Arabian Peninsula became Headquarters Middle East Land Forces, and there were consequential redeployments of Survey staffs and units. In particular the Deputy Director Survey MELF and his staff moved from Episkopi to Aden, leaving a Deputy Assistant Director and small staff in Episkopi and 19 Topographic Squadron moved from Bahrain to Aden, where 2 Army Field Survey Depot joined them from Cyprus. All these moves were completed by October 1963.

Deployments

The main field survey effort during this period was concentrated by 19 Squadron on Muscat and Oman and in the Trucial States, and by early 1963 the 1:100,000 scale mapping had been completed; control surveys and field checks of several town

plans had also been carried out. The Squadron moved to Aden in March 1963 and after a spell of training with recently received Tellurometers the two Troops deployed on control surveys and air photo annotation tasks until December, when they returned to the United Kingdom to join 42 Survey Engineer Regiment. During this period 25 trigonometrical stations had been established, 675 kilometres of second order Tellurometer traversing had been completed and 7500 square kilometres of terrain classified and annotated, at a cost to the squadron of five casualties due to dissident activities.

In January 1964 the squadron was relieved by 13 Field Survey Squadron. 2 Troop were soon deployed to Perim Island to provide shore control for the hydrographic survey ship HMS *Owen* and for the revision of maps of the island, while 1 Troop moved to Sharjah to strengthen the triangulation chain running south to Buraimi, to connect existing triangulation in the Buraimi and Jebel Fahud areas and to identify the Abu Dhabi - Muscat boundary. On their return from Perim Island, 2 Troop carried out altimeter heighting west of Aden and reconnoitred the coastal traverse from Aden to Shagra and the northern traverse from Aden to Lawdar, before being withdrawn to join the force in the Radfan. During August the major features of the Radfan area were connected to the existing traverse network, after which the troop was withdrawn and became 2 Special Tasks Troop to carry out gravity surveys and astronomical observations. During the last quarter of 1964 the coastal traverse reconnoitred earlier in the year was extended and strengthened by an inland loop through Lawdar, the gravity observations were started in Aden and Perim Island and a title gauge set up on Perim Island.

At the beginning of 1965, Perim Island was used to observe a line across the Bab El Mandeb to Ethiopia, in collaboration with surveyors from the United States Army Map Service. As a result of this connection, the South Arabian Traverse was adjusted to the European Datum. In February, 3 Troop of 19 Squadron returned to Aden for work in the Baihan area and subsequently moved to Araq to connect the work to the Main South Arabian Traverse, but bad weather and hostile tribesmen combined to prevent the completion of the task before the troop's scheduled departure for home in August. Meanwhile, 1 Troop, 13 Squadron had completed the Abu Dhabi - Muscat boundary survey and returned to Aden, and after a period of maintenance

moved to Dhofar province where in the six months they traversed 1229 kilometres, classified over 6000 square miles of terrain, established over 4000 spot heights and observed five astronomical azimuths and seven position lines.

This pattern of work then continued for the next two years. In November 1965 1 Troop of 19 Squadron arrived on a five month tour to complete the work in the Baihan area to connect it to the main South Arabian Traverse, and to establish controls on Masirah Island for 1:50,000 scale maps of the island.

In September 1965, a composite troop from 13 Squadron was deployed to Dhofar Province, and in January 1967 a detachment moved to Bahrain to make astronomical observations for the siting of a communications satellite station.

By June 1967 however all field work had stopped as withdrawal was imminent. 13 Field Survey Squadron returned to Barton Stacey in July, the Directorate closed on 8 September and responsibility for the area passed to the Survey Directorate, Headquarters Near East Land Forces in Cyprus. From the latter a detachment took part in a survey of the Oman coast in 1971, carried out jointly with RN surveyors from HMS *Vidal*. Similar operations were conducted subsequently by detachments from the same source tasked with connecting the Trucial States control to Oman and thence to Iran. At one stage, because cross border survey was not possible, the opportunity was seized to establish a station on an oil rig some forty kilometres offshore. Permission was granted to occupy the rig, but only for one night, and it was made clear that drilling would continue. Observing conditions were far from good and the vibration prevented angular measurement, but distance measurement by Tellurometer to Ras al Khaimah was determined and this, together with the two angles measured from the shore stations, provided the connection.

Map Production

Until mid 1963, map production for the area was undertaken by 22 Lithographic Squadron in Cyprus. This ceased, however, with its departure with 42 Survey Engineer Regiment to England, so in March 1964 13 Squadron started production in Aden. Within four months, though, the only available standard size printing machine had broken down and was not replaced for two years, so production was in general limited to work on small format machines. Nevertheless, a large number of 1:50,000 scale

operational maps of the area, and 1:5,000 scale maps of Aden for internal security purposes, were produced locally over this period. With the arrival of Multiplex equipment full specification photogrammetric surveys were taken up for standard 1:50,000 scale maps with priority being given to those covering areas of immediate operational interest.

Map Distribution
Following the redeployments during the period 1961-63, 2 Army Field Survey Depot moved from Cyprus to Aden leaving behind a detachment which was later established as the Map Depot Cyprus. When the decision to evacuate Aden was made known the Depot began moving stocks to Cyprus and to Bahrain and in July 1967 it reopened in Bahrain with a stock of 600,000 and an average monthly turnover of 30,000. In 1971 with the general withdrawal from the Gulf area stocks were reduced to zero, 2 Army Field Survey Depot disbanded and the Map Depot Cyprus became the major map distribution unit for the Eastern Mediterranean.

CYPRUS

Headquarters
With the move in 1963 of the Middle East Survey Directorate from Cyprus to Aden and the departure of 42 Survey Engineer Regiment to England, the Military Survey elements left in the Near East were reduced to a small Survey Directorate with 1 Air Survey Liaison Section, the Map Depot and a map library in Cyprus and map stores in Malta and Tripoli. Subsequently, with the withdrawal of British Forces from Aden geographic responsibility for the area passed to the Near East Directorate. The Deputy Assistant post was consequently upgraded to Assistant Director and in 1968 establishment increases were authorized for both the Directorate and 1 ASLS. In order to carry out its duties this unit had limited field survey, air survey and cartographic capabilities and as may have been expected, was called upon to undertake all manner of survey work beyond its primary role. For major projects, the section was reinforced by units, usually from the UK. There were no map production facilities and therefore all production and printing requirements had to be passed back to the United Kingdom.

Deployments

In 1964, the 1 ASLS field survey element was engaged in establishing a new first order triangulation station on Mount Olympus, and it was also required to confirm a line of sight from Mount Olympus to Hisar Dag in Turkey in connection with the siting of a proposed radio relay station. In November two surveyors accompanied the Joint Services Expedition to Socotra and carried out a control survey and photo annotation in the western half of the island; they also made a reconnaissance of part of the eastern end of the island. The two corporals concerned, Guise and Durup, were each awarded the BEM for their outstanding work in very difficult conditions.[4]

In 1966, further work included establishing a satellite tracking station in Episkopi which required astronomical observations. A triangulation point was established on the roof of the British Military Hospital in Dhekelia and a traverse was observed within the Sovereign Base Area to fix seven control points. Similar work was also undertaken in the Akrotiri Sovereign Base Area. Gravity observations were made during the year to fill gaps in a previous gravity survey. A detachment from the Section accompanied 13 Squadron RAF to Kenya in 1967 and another was sent to Singapore to support the flying programme for Diego Garcia, Mauritius and Rodrigues.

During 1968, a large number of small field survey tasks were undertaken including levelling at Akrotiri and El Adem airfields, and a less routine task was the setting out of the centre line and pylon positions for the Troodos ski lift. In December a detachment from 42 Survey Engineer Regiment was deployed from England to Near East for a levelling task in Malta which continued into 1969, and was completed later in the year by the Section. Towards the end of the year and continuing into 1972, field checking of the new series 1:50,000 scale maps was taken up in collaboration with the Cyprus Lands and Survey Department.

In 1973, the main task was a gravity survey of Cyprus including a connection between Nicosia and Beirut. A total of 386 stations were observed and the survey finally completed early in 1974. Other tasks in the year included provision of control for 1:5,000 scale mapping of the Sovereign Base Areas, several site surveys and the regular checking of and restoration of pillars marking the Sovereign Base Area boundaries.

In 1976, 1 Air Survey Liaison Section moved to Malta and in

the following year returned to England to be collocated with 6 Air Survey Liaison Section. The Survey Directorate closed in March 1979 and by 1980 Military Survey representation in the Near East had been reduced to one warrant officer in the Cyprus Map Store. All future survey activities in this area were to be mounted from the home base.

THE FAR EAST

Headquarters

Since early 1956 an Assistant Director with a small Survey staff had been established in Headquarters Far East Land Forces; the Royal Australian Survey Corps provided a Deputy Assistant Director and also a troop commander for 84 Field Survey Squadron. This situation prevailed until the end of December 1970 when the Survey Branch closed and reopened as Survey Branch Headquarters Land Forces Hong Kong in January 1971, with an establishment of an Assistant Director, a Staff Captain, a Map Research Officer and four NCOs. It continued as such for the remainder of the period.

Deployments

At the end of 1959 84 Field Survey Squadron in Kuala Lumpur had detachments in Malaya, Brunei, Sarawak, North Borneo and Hong Kong, and 570 Map Reproduction Troop was in full production in Singapore. Stocks of maps were held in 556 Field Survey Depot, also in Singapore. However, on 31 August 1960, both units having been raised to support anti-terrorist operations during the Malayan emergency, were disbanded and 84 Survey Squadron was raised in their place in Singapore. With the onset of Confrontation in December 1962 in Brunei, an officer from the squadron was attached to COMBRITBOR as Survey Adviser, and map stores were established at Brunei and Kuching, but manned by personnel from 42 Survey Engineer Regiment.

As has already been mentioned in Chapter VI, at the outset of Confrontation there was no national boundary survey in Borneo and there were virtually no maps either. The boundary was accepted as that which had been agreed between the British North Borneo Company and the Dutch East India Company about the turn of the century. Except for two very small stretches near the coast where ground markers had been established, the

boundary was elsewhere defined as the watersheds between the drainage basins of the major rivers; those flowing generally north and west and those flowing south and east. For almost its entire length the boundary was unsurveyed and passed along a succession of mountainous ridges clad in dense rain forest. The length of the boundary approached a thousand miles and, as one senior officer suggested when seeking more resources, equated to the distance between London and Warsaw.

There was a chain of triangulation along the coasts of Sarawak, Brunei and North Borneo which had been established much earlier but elsewhere there was no survey control. A first step was therefore to dispatch observing parties to existing clearings in the rain forest in order to obtain position fixes from astronomical observations. This work enabled the construction of a series of 1:250,000 maps but there was no height control and relief was depicted by hill shading deduced from the air photography. The maps had several shortcomings; scale was suspect, height information was lacking, the hill shading was unpopular and rivers and streams were sometimes lost under the forest canopy as it appeared on the photography. Without reliable heights, the particular ridge which was the watershed and therefore the boundary could not be positively identified.

A plan to establish rigorous control well inland in the form of composite triangulation and Tellurometer traversing was executed by the two field troops of 84 Squadron, one working from the north, the other from the south. Helicopters ferried first clearing parties, then observing parties to the summits of the highest mountains. Clearing parties roped down through the trees to clear the vegetation and to check the site. Observers measured all angles and distances to first order standards and carried the control in a wide loop from the coast in the south, inland to the areas near the boundary then out to the coast in the north.

Meanwhile, at the 5th United Nations Regional Cartographic Conference held in Canberra, the Assistant Director Survey FARELF and the director of Topography Indonesia agreed informally that collaborative effort was required in the matter of depicting the international boundary as soon as Indonesia's policy of Confrontation was over and more favourable political circumstances emerged. Within days of the ending of Confrontation the Assistant Director Survey FARELF visited Djakarta to initiate arrangements which would provide for the

future co-operation between Military Survey and the Indonesian Military Topographic Service in cross-border surveys.

Meanwhile at the northern extremity of West Malaysia the remnants of the communist terrorists had withdrawn into Thailand and were known to be engaged in relatively low profile operations in the Kra Isthmus. There was no standard mapping and no topographic control in this area either, which was in the gap between the southern extent of the Thai triangulation and the northern limit of the Malaysian triangulation. There was thus a strong case for achieving a cross-border geodetic connection between the two national systems which would provide the framework for full specification operational mapping.

Following discussions in Kuala Lumpur and in Bangkok, it was agreed that 84 Squadron would reconnoitre and design the connection for approval by the National Survey departments, provide technical assistance and training as necessary for Thai and Malaysian surveyors who in turn would observe the stations on their respective sides of the international boundary. The 84 Squadron surveyors were to accompany the survey teams on both sides to operate the Tellurometers. Both National Survey Departments specified that all angles should be measured as well as distances.

The reconnaissance and design were completed in August 1967 and approved in September; however, observations could not be started at once because the Royal Thai Survey Department's funding arrangements could not be completed before November, which happened to coincide with the onset of the north-east monsoon and the worst possible observing conditions. Distance measurements by Tellurometers were made in spite of conditions, but angular measurements, entirely dependent on good visibility, could not be completed until May 1968. The task generated goodwill, it was well executed as a three-nation enterprise and resulted in a very strong geodetic connection between the two national triangulation networks, with all sides and angles measured several times.

When work began in Thailand in early 1967 on the Post Crown project described in Chapter VI, two surveyors from 84 Squadron joined the construction team in order (as was said at the time) "to point the road in the right direction". On completion of their tasks in the north, 1 Troop moved south to establish a new geodetic framework for Singapore including gravity observations and a magnetic survey. Work continued through

June and July 1968 with some assistance from the Singapore Survey Department. Later, a detachment moved to Hong Kong to carry out several minor field survey tasks there.

In September 1968, following the earlier discussions in Canberra and Djakarta, the Director of Topography Indonesia put forward proposals for assistance in the mapping of West Kalimantan, one of the four states in Indonesian Borneo. In July 1969 a draft Memorandum of Understanding was prepared and eventually agreed by the governments of Indonesia and United Kingdom at the end of May 1970. During 1969 the Indonesians had also sought assistance from Australia and the outline scheme of arrangement was as follows:

Provision of air photography	United Kingdom
Traverse and Computation	UK and Indonesia
Aerial distance control and computation	Australia
Heighting	Indonesia
Aerial triangulation and plotting	Australia

In February 1970 a three nation conference was held in Djakarta to settle general arrangements for the task which was designated Operation Mandau. Following an administrative reconnaissance, detailed planning was put in hand in March and after political clearance the field troops of 84 Squadron moved to Pontianak in West Kalimantan in June. The Australians had already arrived and field work began at once. The tasks included a first order Tellurometer traverse of thirteen stations, magnetic and gravity observations at all stations, astronomical observations at selected stations, establishment of a gravity base station at Pontianak and the training of Indonesian surveyors in altimetry and gravity surveys.

With excellent weather and good helicopter support, progress was soon well ahead of schedule. The traverse was completed, a gravity transfer was made from Kuching and the training programme for the Indonesian surveyors ran as far as possible in parallel with the field work. The main body departed on 22 July, followed on 18 August by a small rear party who had remained to complete the training programme.

While the planning and execution of Operation Mandau progressed, a small detachment was sent to Gan to identify certain discrepancies in existing surveys. Astronomical and

magnetic surveys were carried out with the result that the location of the island was moved some 400 metres south and 700 metres west from its previous fix!

The completion of Operation Mandau marked the end of field survey operations in the Far East theatre and 84 Squadron was finally disbanded on 4 December 1970. 556 Field Survey Depot RE was also disbanded on 31 December 1970, but two NCOs remained for duty with 16 Field Survey Depot, Royal Australian Survey Corps to operate the UK Map Store.

Map Production

Map production during 1961 and 1962 included a 1:25,000 scale series of maps of Singapore, a new series of Malaya at 1:63,360 scale and 1:50,000 scale maps of Borneo. In line with the British commitment to SEATO, a large reprint programme of maps of Thailand was also undertaken. In December 1962, the Indonesian Confrontation necessitated the production of some 70 different map sheets of Borneo totalling almost 90,000 copies. As the pattern of operations in Borneo became clearer, the number of miscellaneous tasks decreased and cartographic effort was concentrated on Borneo 1:50,000 scale, Sarawak 1:250,000 scale and Sabah photomaps. Work was also done on the new series 1:63,360 scale maps of Malaya, but towards the end of 1963 it was possible to hand over responsibility for the mapping of Malaya and Singapore to the Director of National Mapping, Malaysia. In the latter half of the year several additional programmes were undertaken in support of operations in both East and West Malaysia, and also for the grid conversion programme following the decision to adopt the Rectified Skew Orthomorphic (RSO) grid in West Malaysia to replace the Malay grid and the Johore grid. It is of interest that the Universal Transverse Mercator grid was unacceptable to the Malaysians because it would have resulted in a grid zone junction along the 102° E meridian in West Malaysia and the 114° E meridian in East Malaysia.

On 25 March 1965 the Bangkok town map, which had been produced by 84 Squadron in four sheets, was presented by the Army Commander Lieutenant General Sir Alan Jolly to Lieutenant General Busrindre Bhakdikal and the occasion was marked by the signing of the United Kingdom-Thailand bilateral map exchange agreement. During the same year, work continued on the Borneo mapping and there was also a heavy

reprint programme in support of SEATO Geographic requirements which continued into 1966.

The ending of Confrontation in August 1966 relieved the pressure on production which was just as well as in 1968 there were breakdowns of the printing machines which restricted their output to about 1 million impressions per quarter. However, mapping of Laos, Thailand, Borneo, the Gilbert and Ellis Islands and Hong Kong was produced, the revision of maps of Fiji and Hong Kong town maps was taken up and production of en route aeronautical charts continued.

By 1969 with the impending withdrawals from the theatre there was some reduction in the printing of standard series mapping, and by 1970 no new work was taken up. The air survey section closed down in February and by August the cartographic section had followed suit.

Map Distribution

In 1960 a new stock control and accounting system was introduced in 556 Field Survey Depot in Singapore as a result of which the stock of some 25 million maps was reduced to 16.5 million by the end of 1962. At the same time a map store was established at 17 Gurkha Division. Rationalization of stock to match operational requirements and increasing turnover to about 200,000 sheets per month led to the approval of an extension to the Depot and improved facilities.

As a consequence of events in Borneo turnover increased to over 600,000 in early 1964. The Depot operated shifts and a seven day week, and stocks increased from 16.5 million to 20 million sheets. With the ending of Indonesia's policy of Confrontation a review of stock requirements was undertaken in 1967 and the Singapore District map store closed in June.

Until the middle of 1968, the stock of maps held by 556 Field Survey Depot remained fairly constant at about 20 million and annual turnover averaged about 5 million. In anticipation of the withdrawal from the Far East, during the period July 1968 to June 1969 locally held stocks of maps were reduced by more than half. Two million sheets were back-loaded to 8 Map and Air Chart Depot, over three million were sent to the Surveyor General of Burma, and some nine million were retained. These included five and a half million which were assigned to SEATO and these became the responsibility of the Australian and New Zealand Forces on 1 April 1969. By the end of 1969 these

SEATO map stocks were absorbed into 16 Field Survey Depot, Royal Australian Survey Corps, which was collocated with 556 Depot. During 1970 further stock reductions were achieved and when 556 Field Survey Depot finally disbanded in December the outstanding stock of some two million maps was transferred to the UK Map Store which remained in Singapore.

SATELLITE GEODESY

In October 1957 the Russians placed the first earth-launched satellite into orbit and immediate interest was aroused into such a system's potential for geodetic and survey purposes. The possibilities of its use to derive distances between widely separated points on the earth's surface and to connect national and continental datums and their related survey systems to form a homogeneous global system appeared at last to be practical.

The first satellite designed for geodetic observations was launched in the United States in 1961 and the Director of Military Survey accepted a US invitation to participate in the programme. In July 1963 the Chiefs of Staff approved the formation of a Joint Service team to participate in the Sequential Collation of Range (SECOR) satellite tracking programme. In January 1964 the first small satellite of the SECOR system weighing forty pounds was launched in the United States with the aim of establishing an equatorial network of some forty terrestrial stations encircling the earth. The system depended on three previously fixed stations being occupied to fix a fourth. Simultaneous radio signals from the ground stations were transponded back by the satellite to obtain a measure of its distance from each station. Several passes of the satellite were necessary for good geometrical conditioning.

A British team to operate one set of equipment was formed, commanded by a Royal Engineer officer, and consisting of two technicians from each of the three Services.[5] Their programme was completed in 1970 and the results incorporated in the 1972 computation of a World Geodetic System. Meanwhile in 1965, 512 Specialist Team was formed to accommodate the manpower required not only for the SECOR team, but for a photographic programme named PAGEOS. The general principle of this latter programme was to employ a Passive Geodetic Satellite (PAGEOS) orbiting at a height of 4,200 kilometres, which was photographed against a background of

stars at known instants of time. The image co-ordinates gave the direction of the line from the camera to the satellite; simultaneous photographs from other stations up to 4,000 kilometres apart gave corresponding directions and hence intersections from which the ground positions could be derived.

Several nations had agreed to participate and the British team for this project, consisting of an RE officer, three field survey technicians and an instrument artificer, was formed in October 1966. Their programme was concluded in mid-1972 and the results were combined with those of SECOR.

A third technique which also became available at this time was derived from the Doppler effect in satellite transmissions, which had been used for navigational purposes. By 1970 it had been developed to the point where it was sufficiently accurate for survey purposes and the decision was taken to phase out the other two systems. The advantages were that simultaneous occupation and observation from other stations were not required, the sizes of the equipment and the team were reduced from 39,000 pounds and eight operators to 200 pounds and three operators, and that observations could be completed in days rather than months, regardless of weather conditions. However, the system depended on a permanent Tracking Network (TRANET) of monitor stations, to determine and update satellites' ephemerides. As part of this network, a station was installed at Barton Stacey in 1970 for continuous operation by 42 Survey Engineer Regiment.

In 1972 512 Specialist Team was accordingly reorganized into a headquarters and three Doppler sections, which were at first deployed in Maine and the Falkland Islands, and in May the following year two sections went to Chile to use the equipment in the translocation mode with a US team in Argentina. During 1972 and 1973 the sections operated around the world in North America, Central America, Europe, the Middle East, Africa, the Atlantic Islands, Hong Kong, Singapore, the Pacific Islands, and in the Mediterranean area.

Tracking the satellites continued from 42 Survey Engineer Regiment at Barton Stacey, and the three sections of 512 STRE were deployed world wide from Norway to Sudan, and from islands in the Caribbean to those in the Indian Ocean. Thereafter for the remainder of the period, the work continued until by 1980 the Doppler Sections had established some 340 stations in over forty different countries.

EXPEDITIONS

A number of individual survey personnel took part in expeditions during this period. One example was that in 1964 when Captain P F Fagan was selected for the Combined Services Expedition to South Georgia. Following disembarkation at King Haakon Bay, a traverse was observed to the Stromness whaling station. Various mountains were climbed and after a difficult journey across the Allardyce Range to Grytviken seven members of the expedition moved to Royal Bay and established a base camp for the survey operation. The existing 1:200,000 scale map of the area was known to be of doubtful reliability and therefore it was decided to carry out a completely new survey and connect it to the rest of the island through the best available control stations near Royal Bay.

The team was divided into two survey parties, a base was measured, position and azimuth were determined from astronomical observations, rocks at sea level were used as a height datum and a network of triangulation was established. A form of terrestrial photogrammetry was used to provide the topographic detail, by mounting 35mm cameras coaxially with the theodolite telescopes; Polaroid cameras were used to provide supplementary information. Weather conditions were very bad throughout the period of the survey work but the task was completed with only hours to spare before the team was taken off the island by HMS *Protector* on 5 March 1965. For his work on the expedition Captain Fagan was awarded the MBE and had the distinction of having the highest point of the Royal Bay area named after him by the Antarctic Place Names Committee.

BOUNDARY COMMISSIONS

In August 1960 a boundary commission was appointed to demarcate the boundaries between the Sovereign Base Areas at Akrotiri and Dhekelia and the newly independent Cyprus republic. Joint survey parties consisting of surveyors of the Cyprus Survey Department and RE surveyors of 42 Survey Engineer Regiment established boundary markers which were then checked by the Commissioners as conforming to the terms of the treaty. Concrete pillars were then constructed and surveyed in to the main Cyprus triangulation. A total of 774

pillars marked the two boundaries and the final report of the Commission was signed in Nicosia in December 1961. Major T F Watling who was in charge of the survey work on behalf of the United Kingdom was awarded the MBE for the part he played.

In 1964 the United Kingdom was requested by Argentina and Chile to act as arbitrator in the case of a length of boundary whose alignment could not be agreed. Negotiations dated back to a treaty of 1855 which included the provision that in the event of disagreement the matter would be referred to the arbitration of a friendly nation. The United Kingdom had fulfilled this role at the end of the 19th century and was again requested to resolve the dispute.

So in 1965 the British Government duly appointed a Court of Arbitration, which included Brigadier A M Papworth. Later in the year Major W D Rushworth was appointed Chief Technical Officer, with Staff Sergeant M G Browning as his assistant. A Field Mission was established and tasked with targetting existing triangulation points for air photography, briefing aircrew, checking the photography achieved and conducting members of the Court through the disputed area. Having completed its tasks, the Field Mission returned to England and a 1:50,000 scale map was prepared under contract by Fairey Surveys, and the two litigants prepared their cases for presentation to the Court. The Court sat for five weeks and the award, based on the Court's report, was made in December 1966. This included the delineation of the disputed boundary and appointed the Director of Military Survey as the authority responsible for demarcating the boundary on the ground.

The Demarcation Mission, consisting of Major Rushworth, Staff Sergeant Browning and Sergeant W G Anderson, arrived in Chile in January 1967. Each of the two nations provided liaison staff, technical and administrative staff, transport which included two helicopters, one light aircraft, land rovers, a boat and horses. Sites for 21 boundary pillars were selected by Major Rushworth, the erection of each was allotted to one or other nation and checked by Staff Sergeant Browning who also prepared all the documentation, records and photographs. The boundary pillars were co-ordinated from existing triangulation by traverse and triangulation and provisional values were issued prior to the Mission's return to England. The final rigorously adjusted computation was carried out by the Survey Production Centre using its Pegasus computer and in July 1967 the Court of

Arbitration approved the demarcation and expressed its opinion that the award had been executed. Copies of the report were passed to Argentina and to Chile, and for their work Major Rushworth received the MBE and Staff Sergeant Browning the BEM.

FOOTNOTES TO CHAPTER XII

1. The official report on one of these tasks quoted the reason for progress being delayed as "the weather has only recently moderated to gale force wind".
2. These and similar tasks were frequently carried out by very small detachments with the responsibilities and frustrations of command being exercised by quite junior ranks. For example, the subaltern in charge of a survey team on Fair Isle had to hand over to his sergeant, whereupon higher authority rebuked the squadron for allowing a sergeant to sign railway warrants. But by the time a case had been put up (and refused) the sergeant had been posted and command delegated to a corporal.
3. Tela barracks was renamed Roy Barracks on 20 May 1965. On that day the Engineer-in-Chief unveiled a plaque in memory of Major General William Roy FRS (1726-1790), founder of the "Trigonometric Survey" established the year after his death, forerunner of the Ordnance Survey.
4. The part played by other members of the Corps on a similar expedition to Socotra in 1967 is described in some detail in Chapter XVI.
5. Lieut Colonel J M Bickford commanded the team as a captain in 1966 when it spent nine months on the British Solomon Islands, during which time he managed to amass a fine sea-shell collection, part of which was subsequently featured in a national exhibition in the United Kingdom.

CHAPTER XIII

THE POSTAL AND COURIER SERVICE

INTRODUCTION - Background - Organization - EUROPE - British Army of the Rhine - NATO Headquarters - THE ARABIAN PENINSULA - Kuwait - Aden - Elsewhere - EAST AFRICA - General - The Lyndholm Container - THE FAR EAST - Malaya - Singapore - Brunei - Borneo - Thailand - NORTHERN IRELAND - PHILATELY - CONCLUSION.

INTRODUCTION

Background

What may at first sight appear to be a strange responsibility for the Corps of Royal Engineers for postal services stemmed from the provision, since their inception, of both mail and telegraph facilities by the civilian General Post Office. By the end of the nineteenth century a military Post Office Corps had been formed for service in Egypt and the Sudan and it was logical therefore that as the Royal Engineers were responsible for telegraph and other communications matters they should embrace the new corps which duly became the RE Postal Section, RE(PS). In 1920 when the Royal Corps of Signals was established in its own right it retained responsibility for handling classified mail and the operation of the Special Despatch Service, but these reverted to the Sappers in 1953 and the title Royal Engineers Postal and Courier Service (REPCS) was adopted thereafter. A further development occurred in 1962 when the REPCS took over from the civil Post Office the responsibility for HM Ships mail. Previously, mail from the Royal Navy and Auxiliary ships afloat had been processed through the GPO in London, but the opening of a new RE mechanized sorting office at Mill Hill offered a capacity to absorb the HM Ships commitment. The new arrangements presented an opportunity to improve the ships' mail delivery system as teleprinter communications could accelerate the complex location change mechanism, so vital to meet the synchronization necessary to connect the mail with arrivals at ports of call. It also became possible to supplement the civil air outlets by RAF flights which were not available to the civil Post Office.

Organization

In the early years of the postal service the officers and soldiers served in the army Reserve in peacetime and were embodied into detachments for service abroad only in time of war. But after the second World War the demand for the services of RE(PS) in numerous theatres overseas led to the permanent establishment of a British Forces Post Office at every major station with detachments forming an integral part of forces deployed on operations. By the early 1960s the Home Postal Depot had been installed at Mill Hill and this in turn set up in 1974 a new Courier Wing to manage the movement by the newly formed Forces Courier Service (FCS) of all classified documents for all three services within the United Kingdom in addition to its worldwide service. The FCS operated a series of scheduled road services in the UK and furthermore provided air deliveries anywhere in the world where the British Government, armed forces or defence industries required a secure courier service. British airlines were used for this purpose wherever possible.

In 1979 a further reorganization followed to form the service into four regiments and to restyle the depot at Mill Hill as the Postal and Courier Depot RE.

EUROPE

British Army of the Rhine

Throughout the period of this volume the British forces in West Germany continued to represent the largest overseas customer of the REPCS, for whom they handled about 60 per cent of their total volume of letters and parcels each year. About thirty BFPOs were serviced from the Postal and Courier Depot at Mill Hill where the mail was initially sorted and flown to Düsseldorf, from where the REPCS sorting office distributed the mail to the relevant areas. There was also a direct delivery to Hannover daily. Outgoing mail from Germany was generally concentrated at Düsseldorf and pre-sorted to civil addresses and BFPO numbers before despatch to the UK. Civil mail was then passed to the civil Post Office and BFPO mail re-sorted at Mill Hill and despatched. Mail for troops in Northern Ireland was despatched direct from Germany and transferred at Heathrow Airport.

In addition to their responsibilities discharged from static peacetime locations, postal detachments practised their roles in war whenever the opportunity arose. For example, field post

offices accompanied troops on all major formation exercises.

Special postal rates existed for mail posted by families in UK to servicemen in Germany and for mail posted internally within the British Forces in Germany to German addresses. Over this time the organization of the postal service in Germany changed very little and the BFPO numbers largely remained those originally allotted to the British garrison towns soon after the war. Latterly a number of machine cancellers were installed in the distribution offices where the volume demanded it.

NATO Headquarters

The REPCS also served all the NATO Headquarters in Europe. Originally this included France, but when France withdrew their direct contribution to NATO in March 1966 the postal service moved with the headquarters to Mons in Belgium with detachments at Brussels, Lisbon, Maastricht, Brunnsum, Naples, Oslo and Sardinia.

THE ARABIAN PENINSULA

Kuwait

In the early years there were FPOs wherever British troops were stationed in the Gulf States and Kuwait, controlled postally from London. When, as is described in Chapter VII, Iraq threatened to annex Kuwait in 1961 and, in line with treaty commitments Britain sent supporting units including 24 Brigade from Kenya and additional naval forces, the brigade brought a postal unit with them[1]. However, the main distribution centre remained in the head Post Office in Kuwait where the FPO was not far from the International Airport. The crisis lasted for about six weeks and the troops were withdrawn in January 1962.

Aden

Meanwhile Aden, as HQ British Forces Arabian Peninsula, for postal purposes came under the control of Middle East HQ in Cyprus. In addition to providing local services it was also responsible for the FPOs at Bahrain and Sharjah and mail services on a limited basis were provided to British Somaliland until 1961 when it became part of Somalia. The main FPO was in the old gaol at Steamer Point with others at Little Aden and Khormaksar. Mail was flown in to the RAF base at Khormaksar, but there were continual problems with the exchanges and

transfers, particularly at Athens, which rendered the service unreliable. On arrival the mail was taken to the FPO at Steamer Point where it was sorted into unit despatches and an announcement broadcast on the Forces Radio Network that the mail was ready for units to collect.

Twice a week, as a routine, mail was sent up country by armed convoy to the troops in the mountains and was frequently subjected to attack by the guerrillas. During the Radfan campaign in 1964 and 1965 an FPO was set up in a dugout at Habilayn as the area was subject to regular mortar and machine-gun attack. In addition a "Flying Postman" in a Beaver aircraft flew a regular circuit delivering mail to some 12 locations, so that two or three deliveries could be made each week to even the most remote units.

During the worst unrest in Aden itself in 1967 there were serious strikes which affected the outgoing mails. Arrangements were therefore made with the local post office that REPCS would handle all the international mail and this was collected at Steamer Point before being taken to Khormaksar and flown by the RAF to Bahrain where it was sorted by the FPO into eastbound and westbound mail and passed to the respective airlines. This service operated until the strikes were over.

Elsewhere

While British troops remained in Aden it was the base for the distribution of mail to Muscat and Oman and a private bag service was operated to Salalah for the Sultan. By the time of the start of the Dhofar revolt Aden had closed and postal control moved to Mombasa, but FPOs were established at the RAF station on the island of Masirah off the coast and at Salalah. They remained in operation after the Sultan was deposed by his son in 1970 and the state renamed Oman, until the eventual withdrawal of all British forces from the area. With the formation of the United Arab Emirates in 1971 the FPOs at Bahrain and Sharjah were finally withdrawn.

EAST AFRICA

General

There were usually Forces Post Offices wherever there were troops or an RAF presence. In the early 1960s these included

one at Francistown in Botswana where an infantry company guarded a radio station, one in Swaziland to serve the resident battalion until the country gained independence in 1967, and others in Tanzania and offshore on the Seychelles and in Gan. Nairobi was the main centre for the transmission of mail within the continent and an FPO remained there throughout this period.

Although independence came to many African states in the 1960s it proved difficult to agree such a transition for Rhodesia with a large black population and a small white controlling government. The Rhodesians announced a unilateral declaration of independence from the Commonwealth on 11 November 1965 and, although the United Nations did not agree to a full trade embargo until 1968, a British blockade was started immediately. The presence of the Royal Navy coastal patrol enforcing the blockade also cut supplies to other land-locked independent African states and, as a result, an oil air-lift had to be organized by the RAF to keep Zambia supplied. The resulting RAF presence called for the existing postal facility in Nairobi to be enlarged and further ones installed in Dar-es-Salaam in Tanzania, two in Lusaka, one in the barracks at the HQ of the Zambian Army and the other at the showground near the airport, and further ones at Ndola in the north of the country where resupply flights were serviced and at Livingstone on the Zambesi.

The mail and newspapers for these forces were carried from London to Nairobi by VC10 of RAF Transport Command and then by one of the 10 to 15 flights per day from Nairobi to Zambia[2]. While in Zambia, a flying mobile FPO operated into Zaire to serve the UN forces; a sapper would fly in on a Canadian C130 aircraft to pick up and deliver mail and would also carry out any other postal business that might be required. A small postal unit also accompanied the troops sent to Zimbabwe as part of the cease fire monitoring force described in Chapter V.

The Lyndholm Container

Having accepted responsibility for supplying mail to HM ships in 1962 the desirability of developing an airdrop system for delivery at sea was soon recognized and trials put in hand to find a suitable watertight container. Early trials were conducted at Aden on a variety of devices using an Argosy aircraft to make the

drops which were recovered by launch. As a result of these trials the Lyndholm air-sea rescue container was selected, which proved invaluable when the Royal Navy set up the Beira Patrol to enforce trade sanctions against Rhodesia. Demand was such that the factory went into full production to supply a total of 3,000 containers.

The patrol was based initially on Aden and then moved to Mombasa which became the logistic centre and where the supply ship *Triumph* was based for resupply of ships at sea. Mail for the patrol was flown to Mombasa where it was packed into the containers. These were then flown on the RAF resupply Argosys to Majunga in Malagasy, where Shackletons were based which would in turn drop them to the patrol.

A full-scale air-drop programme was introduced to serve the ships during which over 1,000 successful container drops were made with only one minor mishap initiating a signal from HMS *Eskimo* which read "Damp but readable, keep them coming". Drops were made five to six days each week with the containers being returned on supply ships to Mombasa. Experience showed that the durability of the Lyndholms was such that they could be used six or seven times without replacement.

THE FAR EAST

Malaya

Until April 1960 there was a British Army postal detachment at Butterworth in Province Wellesley opposite Penang whose primary task was to service mail for troop-ships stopping at Penang. The unit did not use British postage stamps and relied on the civilian services for connecting despatches and was disbanded with the demise of sea trooping to the Far East.

In 1960, Captain R J N Kelly of the REPCS was sent to Malaya to form the Postal Unit for 28 Commonwealth Independent Infantry Brigade, The unit was composed of one officer and 12 men, including Australian personnel, located at Taiping in Perak, and responsible for servicing the brigade and the North Malayan Sub-District. As a Commonwealth unit it could not employ normal FPO procedures and the use of Malayan stamps at special rates continued. Although mail came in direct from the UK, there was no allocated BFPO number and the letters were addressed "care of the Civil Post Office".

In 1961, the brigade moved with its postal unit to a new purpose-built camp at Terendak near Malacca and remained there until it moved again to Singapore early in the 1970s. The unit then became titled ANZUK-5 and operated forces mail from Singapore to UK, to Australia and New Zealand and was not only international but joint-service staffed. It was joined in April 1970 for nearly five months by a detachment from 3 Division postal unit when 19 Infantry Brigade deployed by air to Malaya for exercise Bersatu Padu described in Chapter VI. The United Kingdom unit set up a base office collocated with that already resident in Singapore and sent FPOs forward to support the units on exercise in the jungle.

Singapore

Throughout the period postal services in the theatres were supervised by a Deputy Assistant Director Postal Services in HQ FARELF. Initially 302 Postal Unit also in Singapore handled mail for the troopships passing through, but, like its Penang counterpart, this role was discontinued in the early 1960s. At the time of the Brunei rebellion and the early days of Confrontation in Borneo many of the troops taking part left their families in Singapore and the local supply of UK postage stamps was insufficient for the increased volume of mail. As a result the postal units had to handle occasional unstamped letters, albeit some accompanied by the necessary payment in cash. There were also examples of envelopes bearing both British and Singapore stamps duly being cancelled.

Brunei

On 8 December 1962 the Brunei Peoples Party launched a revolt (see Chapter VI) with forces trained in Indonesia. At the request of the Sultan British and Gurkha troops of 99 Gurkha Brigade were flown in on 8 December. As they had no postal unit attached, the 28 Brigade unit was withdrawn from Malaya and sent to Brunei. The advance party comprising Captain Kelly and a corporal flew to Labuan and established an FPO there and on 12 December moved to Brunei and established another at the airport. At this time there was a 22-hour curfew and no civilian postal service so three days later the postal unit took over the civilian Post Office and all its stock, some of which had been partially looted. It opened up full facilities using British stamps as far as possible. A further FPO was established at Seria to support

the Queen's Own Highlanders who were guarding the oil installations there. The main impetus of the rebellion soon collapsed and the postal unit returned to Malaya in February 1963.

Borneo

However, tension was growing meanwhile in North Borneo and the first action between Indonesian and British forces occurred on 12 April 1963. 28 Brigade Postal Unit was again ordered forward, this time to Kuching in Sarawak, to form the nucleus of a postal unit to be reinforced from the UK. This unit was to be in support of 3 Commando Brigade, Royal Marines. From then, for as long as the confrontation continued, the postal services throughout North Borneo were considerably expanded.

In September 1963 a DADPCC was appointed, located in Labuan to control the postal operations. As reinforcements began to arrive from England 28 Brigade Postal Unit was withdrawn, but members had to return to Borneo from time to time, particularly when units changed over. Despite the end of Confrontation in 1966, postal units remained in Brunei town and Seria for the remainder of the period to service the training unit working with the Royal Brunei Army and the battalion that remained with the Sultanate respectively.

Thailand

In 1964 when Sapper units were deployed in North Thailand near the Thai border with Cambodia at Leong Nok Tha to build Crown airfield as described in Chapter VI, they took with them a detachment from 302 PCU in Singapore. FPOs were set up in a hotel in the main civilian air base in Bangkok, at the American air base at Ubon which acted as rail and RAF airhead for the operation, and at Loeng Nok Tha itself. These arrangements continued for the Post Crown road operation, on completion of which at the end of 1968 the post offices were withdrawn, except for that in Bangkok which continued for the remainder of the period to provide a courier link to Nepal and Diego Garcia in the Indian Ocean.

NORTHERN IRELAND

In the early 1960s all British forces in the Province used the

civilian post, but when in August 1969 major sectarian violence erupted and the first troops of 3 Division were deployed, Captain I Winfield and 11 other ranks of the REPCS accompanied them. Northern Ireland became BFPO 801 and FPOs were established with courier offices at Lisburn and at HMS *Sea Eagle*, a Naval shore establishment near Londonderry, where 24 Brigade was based. The FPOs operated a normal postal and courier service with a dedicated courier service for the Home Office operating between Stormont and Downing Street. There was also a helicopter service daily between the various troop locations in Northern Ireland. In the same year Forces Free Aerogrammes were introduced and, soon after, the volume of mail had become large enough to warrant the use of machine cancellations at Lisburn.

In 1978 the postal service for the forces was revised and the number of BFPO allocations increased to eight with an FPO at each. Limited sorting was carried out at Lisburn with mail being pre-sorted into the main UK regions and BFPO numbers before despatch to the UK. The BFPO sorting was further refined at Mill Hill and was a most important function as many of the units serving in Ulster were based in Germany where their families remained.

In general throughout the Province there was a daily road link between the BFPO locations with return to Lisburn for despatch, and a periodic helicopter service to reach locations inaccessible by road. In addition, a daily delivery to Belfast was operated by the FCS for secure mail between Northern Ireland and the mainland.

PHILATELY

In line with the increased worldwide interest in stamp collection the Forces Philatelic Bureau was established within the Postal and Courier Depot, with a mobile display team for use at exhibitions and displays. One of their main activities was to produce commemorative covers, usually to mark events of military and Royal Engineer significance, for the armed services. The service started in 1968 and between then and the end of the period 386 such issues were sponsored, for each of which some 2,000 covers were produced. A special edition was also prepared annually for each Royal Tournament.

CONCLUSION

The armed services had for long recognized that the uplift in morale resulting from a properly organized postal service was out of all proportion to the specialist manpower involved. Elements, however small, were therefore included as vital components in every major operation in which British troops took part and this chapter has highlighted some of the major ones in which they participated. Postal detachments were also set up in innumerable remote locations to support a wide variety of activities, for example at Cape Canaveral during the Blue Streak trials, in Anguilla after the uprising in 1969 and on Beef Island during airfield construction the same year. Often the setting up of such isolated detachments and the maintenance of regular deliveries thereafter called for the use of much enterprise by those responsible[3]. They were also present in Canada, Nepal, Hong Kong, Korea, Cyprus and elsewhere in support of our allies and on peacekeeping operations. Whenever practicable they took part in exercises both at home and abroad and were present at many Reserve army camps throughout the United Kingdom. But their major contribution throughout this period was their continued efficiency in providing a rapid and regular service, however difficult the circumstances that prevailed.

FOOTNOTES TO CHAPTER XIII

1. A postal lance corporal was despatched from Aden with his stock to set up in the civil post office in Kuwait in advance of the arrival of the main reinforcement from Kenya. The NCO quickly established himself in a flat, complete with servants and a brand new landrover, much to the subsequent surprise of the commander of 24 Brigade who had to make do with a billet in a school and only the personal services of his driver.
2. It was possible for papers that were printed at midnight in London to be read in the mess at Lusaka the next afternoon, and it was not unknown for officers called to briefings at the High Commission to be better informed on the international situation by having already read The Times.
3. Colonel A V Burge recalls that he was sent out as a major in 1963 to inspect the postal arrangements in British Guiana (later Guyana) where a Guards battalion was stationed. Shortly after his arrival a major strike took place, stopping all scheduled air moves and therefore mail deliveries. He managed to leave by night in a light aircraft for adjacent Surinam where he was arrested for illegal entry and temporarily detained until he could identify himself to the Dutch Army as a fellow NATO officer. He managed to set up a

service for mail to British Guiana via Surinam using a float plane to cross the Courantyne River with the help of the Dutch. Thereafter for the remainder of the strike he initiated a delivery using RAF supply aircraft which were flying from Barbados to Georgetown and returning with guardsmen taking local leave. In the course of his investigations he unearthed a rat infested hangar full of missing mail at Port of Spain. His protestations to the local authorities caused him to be deported as persona non grata by the local Superintendent of Mails, but undoubtedly explained why the troops were not getting any letters.

CHAPTER XIV

THE RESERVE ARMY

INTRODUCTION - SPONSORED UNITS - Organization - Roles - Training - Engineer Specialist Pool - THE TERRITORIAL ARMY - General - The Royal Monmouthshire Royal Engineers (Militia) - The Regiments - Airborne Units - The Engineer and Railway Staff Corps.

INTRODUCTION

From very early days, Britain has maintained a part-time Army, capable of being mustered at short notice to reinforce the regular forces in an emergency, initially for home defence and to maintain law and order and, latterly, to provide a means of reinforcing the field force overseas. After World War Two, the major components of this reserve became the Territorial Army (TA) - reformed in the main on a divisional formation basis as had existed in 1939 - and the Army Emergency Reserve (AER). In Chapter I of this volume the general reorganizations which were imposed upon the Reserve Army over the twenty years after 1960 are discussed, as they applied to the army as a whole. In this chapter we will look at the way in which these changes affected the units and individual reservists in the Corps. The Reserve Army order of battle and the effects of the various reorganizations upon it over this period are given in Annex F.

SPONSORED UNITS

Organization

Senior in regimental precedence to the Territorial Army, the Supplementary Reserve had been raised in 1947 to provide in war some of the specialists which a peacetime Regular Army could not afford to train and maintain. In 1952 the name had been changed to Army Emergency Reserve (AER) whose personnel were spread throughout the land, had no local barracks from which to operate and usually only met as complete units on annual camp. Their liability for service also varied depending upon the category within which they lay, described in Chapter I. With the impending end of National Service and therefore the input of soldiers to complete their

Reserve liability, recruiting was becoming increasingly difficult. By 1960 RE units were grouped by specialization into Transportation and Movement Control, Field and Works, Resources, Bomb Disposal, Survey, Bulk Petroleum and Postal and Courier. By the same time the headquarters of the AER (Field and Works) had left the Engineer Training Centre at Ripon and moved to Morval Barracks at Cove in Hampshire under Headquarters RE Training Brigade in Aldershot. Its order of battle then consisted of HQ 25 Engineer Group and eight engineer regiments and a number of CsRE Works, STsRE and Specialist Pools. However, due to their low strength, these units were in effect no more than cadres, and indeed it was not uncommon at camp to find bridging parties formed entirely of officers and SNCOs.

In 1961 the regiments were amalgamated to form one large construction regiment (111 Engineer Regiment) which became at that time the largest regiment in the British Army. The Commanding Officer, who had previously commanded one of the eight engineer regiments, was Lieut Colonel W C S Harrison, County Surveyor of Berkshire, who subsequently became Deputy Commander CVHQ RE, and before retiring was made CBE and an ADC to the Queen. Also in 1961 there was a rearrangement of the CsRE Works and specialist teams and two years later the Group Headquarters was disbanded.

In 1965 the transportation elements had been transferred to the Royal Corps of Transport and on the formation of the TAVR in 1967 the three remaining bomb disposal regiments were reduced to one specialist team while field, works and resources all became the responsibility of the Central Volunteer Headquarters at Cove. The Sponsored Units, as they were now known, consisted of one construction regiment (111 Engineer Regiment with two squadrons), one park squadron (with a separate well drilling detachment), one Engineer Specialist Pool and nine Specialist Teams, the latter covering petroleum (three teams), power station, procurement, public utilities, construction (two teams) and railway construction.

This organization remained virtually unchanged for the rest of the period with which we are concerned. At the same time as the formation of the TAVR, the headquarters at Cove became the Central Volunteer Headquarters RE (Field, Works and Resources). Four years later in 1971 it moved into Minley Manor, Camberley, to join the Training Brigade Headquarters.

Roles

As the raison d'etre of the Sponsored Units continued to be the provision of specialist engineering skills in the event of war, their junior ranks element comprised a very high percentage of specialists and skilled tradesmen, while their officers were, in general, well-qualified chartered engineers. A measure of the quality of the more senior ranks can be gauged by the fact that during the period under review the commanding officers of 111 Engineer Regiment included three County Surveyors or County Engineers.

There was necessarily a close cooperation between the regular and reserve specialist teams and the Specialist Pool, the latter at times providing the expertise which was not available in the Regular Army. During the period 1975-78 in particular, as a result of the formation of the United Kingdom Mobile Force (UKMF) and the Military Works Force (MWF) the two types of team began to work closely together on exercises in BAOR. When 3 Infantry Division moved to BAOR in 1975 the UKMF took over some of its operational roles in the Schleswig-Holstein area of Germany and on the southern flank of NATO in Italy, Greece and Turkey. The regular engineer support was provided by 22 Engineer Regiment, whilst 111 Engineer Regiment with 74 Engineer Regiment provided the reserve army reinforcements. Their role was to provide engineer support on the lines of communication from the port of entry to the area of operations, and in this they were assisted by Construction and Petroleum STsRE. The remainder of the Specialist Teams became part of the MWF in war, their role being to provide similar engineer support from the Channel ports to 1(BR) Corps rear area.

Training

Whereas the role of the TA Engineer brigades was primarily to provide combat engineer support to the Regular Army, and therefore their training was essentially directed towards the improvement of combat engineering skills, the role of the Sponsored Units required them to practice their specialist skills as well. While adhering to the principle "first a soldier, then a sapper" and ensuring that their basic military skills were properly exercised, the training of the Sponsored Units was always directed in the main towards their most likely role in the event of hostilities. To this end the annual two week camps, particularly

for the Specialist Teams, were something of a busman's holiday, rehearsing the normal civilian occupations of the units' members in a military setting. The scope for useful training with a visible end product was therefore considerable and there were frequent demands from overseas theatres for the services of these units, particularly those of the construction regiment (111) and the STsRE Construction and Public Utilities. For example, during the period 1970-1975 out of a total of 72 two-week unit camps, 49 were overseas - 15 in BAOR, 18 in Cyprus, 11 in Gibraltar and five in Malta. Careful prior reconnaissance and discussions in host countries, often at government level, usually carried out by OCs or Specialist Pool Officers, enabled each Sponsored Unit to complete remarkable amounts of worthwhile work in the fortnight and reports, design calculations and quantities of drawings were produced and handed to host organizations or units.

Tasks undertaken during these camps varied from the reconstruction or repair and maintenance of existing facilities to the completely new construction of items such as culverts and bridges, school extensions and club houses. A major project was the complete construction of the 7,000 square metre Europa Promenade in Gibraltar, designed by 525 STRE (Construction) during 1972, and built during an eight week period in 1974 by 111 Engineer Regiment, working through successive half squadron camps of two weeks each[1].

In 1977, 504 STRE (Power Station), backed by tradesmen from 12 Engineer Brigade, designed and built a medium electricity generation and supply system on the island of Colonsay in the Inner Hebrides. Four new generators, associated fuel supplies and switch gear were installed together with 33 poles and 3,000 metres of overhead line. The Highlands and Islands Development Board financed the scheme which gave Colonsay an up to date and secure electricity supply for seven years until the island was connected to the National Grid.

The reserve army well drillers were often in demand to help out their regular specialist team counterparts to enable them to take leave, for example, or when their services were urgently required elsewhere. During the late 1970s a large proportion of the volunteer well-drillers' time was spent in Cyprus because the regular teams normally deployed on the island were involved in operations in Oman.

Also of great value were the three Specialist Teams

Petroleum, recruited respectively from BP, Esso and Shell. As with the other teams, the officers and men were very experienced, many having been involved in the early development of the North Sea oilfields[2].

Engineer Specialist Pool

An unusual Sponsored Unit was the Engineer Specialist Pool, formed by the merger of the Geologists and Engineer Works Officers' pools. As the name implies, the pool included a number of highly qualified engineers and geologists who were deployed on temporary attachment to regular units throughout the world where there was a need for their specialist expertise[3]. As well as BAOR, Cyprus, Gibraltar and Malta, varied tasks took them as far afield as the Caribbean, Libya, Bahrain, the Oman, Aden, the Seychelles, Nepal, Thailand and Hong Kong. In 1979 they were also heavily involved in the UK airfield damage repair plans, a consequence of which was the setting-up later of TAVR ADR teams for UK airfields.

THE TERRITORIAL ARMY

General

Numerically the largest component of the reserves, the Territorial Army at the end of the 1950s was primarily composed of ten divisions, each with its affiliated Engineer Regiment. In addition, there were a number of other units, including Construction and Army Engineer Regiments and transportation units, grouped for matters of training coordination and administrative convenience into Engineer Groups, Railway Groups and Port Task Forces. Regiments and squadrons usually had their own drill halls, owned and administered by the local Territorial and Auxiliary Forces Association, and a small Regular Army permanent staff, usually consisting of an adjutant, quartermaster and regimental sergeant major at headquarters and a Permanent Staff Instructor (PSI) NCO at each squadron. Some regiments had Regular commanding officers, and units with a volunteer strength in excess of 400 were entitled to a Regular Training Major. Training was conducted once or twice a week on "drill evenings" and at weekends, but the main opportunity for the regiment to practice as a coherent whole was the fifteen day annual camp. When the divisional organizations disappeared in 1967 and the

TAVR was formed, the residual RE units were reformed initially into five regiments, (R Mon RE(M), 71, 72, 74 and 75 Regiments), to be joined by 73 in 1969, with overall control exercised by two Engineer Brigade[4] headquarters, 29 Brigade initially in Edinburgh but moving to Fenham, Newcastle in January 1968, and 30 Brigade at Stafford. The former brigade was responsible for reinforcing rear areas in BAOR, the latter 1 British Corps. At the same time, all Reserve Army units and formations, irrespective of whether they were descended from the old TA or AER, were given the suffix "Volunteers", denoted by "V" after their title, except for the R Mon RE which retained its original Militia (M) designation.

Over the whole period with which we are concerned, training was basically to the same end - to train the men to Combat Engineer B2 standard, with certain NCOs to B1, and the officers in command and control of their units. All ranks received Regular Army rates of pay when on whole day training, plus a bounty of £25 per year, tax free. In 1967, with the creation of the TAVR, a liability bounty of £60 per year, taxable, was introduced as an additional inducement. If a man was available for call out for the full 12 months, he received this sum provided he had attended annual camp, fired his range course and attended six days out of camp training. If he had attended a further six days training and been certified efficient by his CO, he also received his training bounty of £25 tax free. As time wore on, however, the financial inducements became progressively less attractive and serious thought had to be given as to how to keep the TAVR up to strength and to stop wastage or turnover which was becoming a serious problem. In 1978 Major General P C Shapland who had just completed four years as Director Volunteers Territorial and Cadets was asked to undertake a study of this problem. This culminated in the "Shapland Report" among the recommendations of which were the proposals to increase the annual bounty to £300 and to rename the AER and TAVR as the Territorial Army.

In the early 1960s the two main motives which made many join the Territorial Army were, first, money - particularly as it was usually paid in cash on the same day as the training was completed - and, second, the desire to do something far removed from ordinary day to day work in a socially congenial environment. Much of the fine detail of training and organization had to be improvised because it was often impossible for the

organizer to know precisely who would be available until the last minute. Anything involving travel in the early days was lengthy with practically no motorways and few dual carriageway roads and regiments usually went to annual camp by train. Patterns of dress and equipment lagged behind that of the regular army: for years smart turnout was inseparably linked with Brasso, blanco and boot polish and the only way to keep warm in the cab of a Bedford lorry was to take the cover off the engine. Radio operators changed valves, drivers double declutched, all ranks wore gaiters with their boots, inky orders emerged reluctantly from the Roneo duplicator and the kick from a Lee Enfield rifle butt caused many a sore shoulder.

Throughout this period there were certain fundamental factors which the small nucleus of regular army permanent staff integrated within units and headquarters had to keep constantly in mind. High in importance among these was the critical need to ensure that the very limited time available for training was profitably spent. Long periods were devoted to the training of officers and NCOs in the regular army for which time simply was not available to their reserve counterpart. Equally vital was the need to ensure that training was fun. Most members of the TA were busy people who would not be prepared to give up the not inconsiderable spare time demanded unless they actively enjoyed what they were doing. Finally, there was always the overriding importance of nurturing unit loyalty, a task often made more difficult at regimental level when squadrons were widely dispersed. As Brigadier R W M Lister, who commanded 72 Regiment in 1967, has recorded: "If we were ever required to pack our bags and go at short notice to war we would be faced with enormous problems and dangers and would need all the comradeship and regimental and squadron loyalty that we had been able to build in days of peace to pull us through."[5]

The Royal Monmouthshire Royal Engineers (Militia)

With a history going back to 1539, the Regiment proudly and rightly claimed to be the Senior Regiment of the Reserve Army[6] with its own distinctive cap badge[7] and colours. Directly descended from the Royal Monmouthshire Militia, it became part of the Corps in 1877, but due to some uncertainties over its earlier foundations, its Tercentenary Celebrations were not held until 1960. By this time, the Regiment, without a drill hall of its own but with its headquarters in Monmouth Castle, consisted of

three field squadrons, 100, 101 and 111, the whole comprising an army engineer regiment. Under the reorganization of 1961, the Regiment was reduced by one squadron (111) and became a corps engineer regiment, joining 125 Regiment with a similar role, together to form 23 Engineer Group (TA). The field park support for this group was provided by 247 (Glamorgan) Field Park Squadron and because of their close proximity, being based at Cardiff, there was considerable integration between the two units in training and particularly at annual camp thereafter. It became apparent when the draft plans for the next reorganization became known in the summer of 1965 that the "Royal Mons", as they were affectionately known, were scheduled to be disbanded, to be replaced by some ephemeral unit called "70 Engineer Regiment". Once the disbelief that such a fate could be in store for a unit of such age and seniority had been overcome, determined efforts were made to lobby the Ministry of Defence to change its plans, initially without success.

It was perhaps fortuitous, therefore, that a dinner had been planned for 25 September 1965 to which the Chief Royal Engineer, Engineer-in-Chief, Lord Lieutenant and Chief of Staff Western Command had been invited, and at which the Honorary Colonel and others spoke convincingly of the Regiment's need for survival. It was indeed a great relief when the White Paper published in December revealed that the Regiment, though losing 101 Field Squadron and its band, was to live on after all by inheriting 108 (Welsh) Field Squadron (hitherto 53 Welsh Division Engineers) and 25 (City of Birmingham) Field Squadron, (the remnant of 48 Division Engineers).

In 1971 the Regiment was honoured with the Prince of Wales Award and in 1977 two anniversaries were celebrated: the 400th year since formation and the centenary of this particular Militia joining the Corps. The following year, the Freedom of the City of Swansea was conferred on the unit and later in June His Royal Highness the Duke of Gloucester, Honorary Colonel, visited the Regiment while undergoing its annual camp in Germany.

The Regiments

71 (Scottish) Engineer Regiment

The regiment formed on 1 April 1967 on the disbandment of four TA Engineer Regiments based in the Scottish Lowlands, with its headquarters in Glasgow. Many of the staff of the latter

had served previously in 80 (Scottish) Port Regiment whose forbears had operated Mulberry in 1944. It consisted of 102 (Clyde) Field Squadron (descendents of the 1st Lanarkshire Engineer Volunteers raised in 1884 to defend the Clyde estuary), 104 (City of Edinburgh) Field Squadron which traced its origins back to 1860 and 124 (Lowland) Field Squadron descended from 52 (Lowland) Division Engineers. The role of the regiment was to provide support to BAOR and it trained on the Continent for that purpose at intervals over the next few years, including building over 1000 feet of Heavy Floating Bridge across the Rhine near Emmerich in April 1974. Later that year the CO (Lieut Colonel R L Jordan) with the regular element of the regiment commanded the Engineer task force for Operation Slant, the clearance of refuse caused by a strike in Glasgow.

In a more cheerful vein other members were regularly responsible for control of the lighting of the arena at the annual Edinburgh tattoo. The unit had its own Pipes and Drums which in 1978 became affiliated with those of the Queens Gurkha Engineers of the Regular Army and which performed at locations as widely separated as Edinburgh, the Netherlands, Tasmania and Hong Kong.

72 (Tyne Electrical Engineers) Engineer Regiment

The foundations of this regiment had been laid down in 1859 when a company of men from the Armstrong factories in Elswick formed the nucleus of the Newcastle-upon-Tyne Engineer Volunteers, who subsequently became the Tyne Electrical Engineers in 1911. Throughout both world wars they served with distinction as construction and searchlight companies and as anti aircraft battalions. Their direct descendent 103 Field Squadron at Newcastle joined 118 Field Squadron at Hartlepool and 129 Field Squadron at Hull to form 72 Engineer Regiment in 1967. About once in every three years the annual camp was held in Germany, usually at Hameln[8]. In 1973 118 Field Squadron participated in the annual RE demonstration at Chatham, the first Reserve Army unit to do so, by showing the construction of 30 metres of double storey Medium Girder Bridge. In 1975 the regiment was tasked with responsibility for provision of some of the support required for the Harrier Force, including the construction of forward operating pads and hides, and in the same year 105 (Tyne Electrical Engineers) Plant

Squadron came under command. In 1977 129 Field Squadron transferred to 73 Engineer Regiment.

73 Engineer Regiment

This regiment was not formed until January 1969, but traced its origins to the volunteer forces of a hundred years earlier, in particular the Nottinghamshire (Robin Hood) Battalion. Through many changes in name and role, including operation as a searchlight regiment in World War Two, that unit became 350 (Robin Hood) Field Squadron in 1961, but reverted to infantry in 1967, reducing to a cadre two years later. Some personnel, however, formed the nucleus of the headquarters of 73 Regiment when established that year in Nottingham. The regiment, with its headquarters at Bilborough, on formation consisted of 272 Field Squadron (which subsequently became a Field Support Squadron for 74 Regiment), 217 (London) Field Squadron and 575 Field Squadron, to be joined in May 1977 by 129 (East Riding) Field Squadron from 72 Regiment[9]. They also took under their wing (very appropriately) 873 Movement Light Squadron, the only remaining searchlight unit in the British Army which was called upon to provide "artifical moonlight" on many BAOR exercises and was much in demand for tattoos and displays in peacetime. Initially the regiment formed part of 29 Engineer Brigade with a role in 1(BR) Corps rear area, but they were transferred to 30 Engineer Brigade in May 1977.

74 (Antrim Artillery) Engineer Regiment

On April 1 1967, following the reorganization of the TA into the Territorial and Army Volunteer Reserve, 146 Corps Engineer Regiment and 591 Field Squadron were amalgamated and 74 Regiment formed, consisting of the two remaining units 112 (Antrim Fortress) Field Squadron and 114 (Antrim Artillery) Field Squadron. However, the whole unit was concentrated in one drill hall in Belfast which, as it later turned out, was not in a very suitable location once the "Troubles" started. It had lost its original excellent accommodation in Carrickfergus which was sold to the local council. This reduced the catchment area for recruits and those who had to travel any distance to the new drill hall gradually left.

In late 1968 114 Field Squadron formed a troop in Ballymena, and 112 Field Squadron followed this with a troop at

Bangor in August 1971. During 1976 further field troops were formed in vacated Ulster Defence Regiment premises in Carrickfergus (112 Field Squadron) and Antrim (114 Field Squadron). Expanding even further afield, 272 (West Riding Artillery) Field Support Squadron RE (V) based at Bradford, became part of the Regiment on 1 May 1977.

At the same time, the regiment transferred to 29 Engineer Brigade (V), still with a reinforcement role to 1(BR) Corps. This was a transitional phase until 1 April 1978 when the regiment joined the Logistic Support Group of 6 Field Force, with its reinforcement role under the Supreme Allied Command Europe. While various officers and men attended the annual Germany exercises each year, the regiment as a whole did not take part in an overseas exercise until 1978 when, as part of 6 Field Force, it went to Schleswig Holstein to take part in Exercise Bold Guard.

In August 1969, following rioting in Londonderry and Belfast, the Regular Army had been reinforced in Northern Ireland to keep the peace. As far as the TAVR was concerned, training continued as usual, until a TAVR soldier travelling to attend training in uniform was shot in the centre of Belfast. From then on, all personnel had to arrive in civilian clothes and change in the Centre.

Arming of the TAVR when on duty outside the centre started very slowly[10]. After 1971, all vehicles leaving the centre for training had to carry escorts, armed, flak jacketed and carrying a yellow card giving instructions as to the circumstances under which they might open fire. The situation greatly restricted training outside the centre, much of it having to be carried out on the mainland, usually in Scotland, with the men going across the Larne ferry.

The Regimental Pipes and Drums had first been formed in 429 (Antrim) Coast Regiment in 1950, but were not established as a band. Their uniform consisted of battledress jackets and tartan kilts. The Honorary Colonel of the time, the Earl of Antrim, granted to the pipers the right to wear his family tartan, that of MacDonald of the Isles tartan, for kilt and plaid, and his personal retainers' badge. In 1972 the Regiment exercised its right to march through the City of Ripon with pipes and drums playing and bayonets fixed, and the Regiment participated in a parade of Royal Engineer Regiments when the Freedom of the City of Hameln was conferred on the Corps in 1977. On this

occasion the Regiment was the only Volunteer Regiment and its Pipes and Drums were the only Pipes and Drums on parade.

75 Engineer Regiment (V)

The Regiment was formed in 1967 of units from a wide geographical area. They included elements of 42 Division Engineers from Manchester, 113 Assault Regiment from Cheshire, 107 (West Lancs) Corps Engineer Regiment from the Liverpool area and 49 Armoured Division Engineers from Sheffield. Three of the Regiments had histories dating back to the middle or late 19th Century. A Training Headquarters was formed at Failsworth, Manchester with 106 Field Squadron in Sheffield and 107 Field Squadron in the Liverpool area. Problems associated with new organizations were well illustrated in this particular formation. Quite apart from the dismay and disappointment old and distinguished units felt at being so drastically mutilated, some amalgamations flew in the face of long standing local antipathies. Any mutual distrust still lingering between Yorkshire and Lancashire, or Manchester and Liverpool, for example, was inflamed when matters such as sharing Mess silver and trophies had to be resolved. Much of it had been donated by previous generations or paid for by local subscription. Such feelings die hard and undoubtedly suspicions and doubts between any individuals made the early years of training as a complete regiment very difficult.

In 1969 the Training Headquarters became an established Regimental Headquarters and a third field squadron formed from the residue of 42 Divisional Engineers and the Duke of Lancaster's Own Yeomanry, designated 202 (DLOY) Field Squadron. Shortly afterwards, however, the Yeomanry reformed as their own Regiment and the Squadron lost the title and dress distinction of wearing chain mail epaulettes. Also at this time 75 Engineer Regiment Workshop (V) formed at Oldham from elements of 40/41st Royal Tank Regiment.

Life in the units in early days was characterized by improvisation, reorganizations and amalgamations. Drill nights were held on Tuesdays and Thursdays with the former night given over to training and the latter night to sporting and social activities. The occasional training weekends were more often than not given over to convoy and harbour drills or signal training with scarce radio sets. Nevertheless sub unit strengths increased sufficiently to allow them to spend more time

supporting their affiliated Brigades at the weekends and at Annual Camp. Social life in the sub units was well supported. The main events of the year, each with their own theme and staged in the Drill Halls, were the objects of elaborate preparation and hard work. In 1967 early perceptions of a "disbandment" of the TA caused considerable alarm and protest when Government intentions were modified to a "reorganization", leaving units the painful task of choosing who in their numbers were to serve on or retire. Many were retired only to be called back again to help ease the more difficult aspects of the dramatic and unpopular changes.

Training was decentralized to sub unit locations, but every opportunity was seized to undertake works in aid of the civil power and community. Large scale demolitions were executed; emergency bridging was provided and large scale construction tasks were completed in places as distant as the Isle of Skye. Eventually the training routine settled down to a three year cycle of individual training and a Scotland Camp; unit level training and a Weymouth Camp and formation level training leading to a BAOR Camp. In 1980 the St Helens Council conferred the Freedom of the Town jointly on 75 Regiment RE and 103 Regiment RA.

Airborne Units

Despite the reduction in 1956 of 16 Airborne Division to a single brigade (44 Independent Parachute Brigade Group), the strength and reputation of 131 Airborne Engineer Regiment was such that it was retained in toto to support it. Regimental Headquarters remained with the Brigade Headquarters and moved with it to the Duke of York's Headquarters, Chelsea. Notwithstanding the loss of ex-National Servicemen, the strength of the unit remained at over 1000 active volunteers and in the early 1960s was the largest parachute trained unit in the brigade. Squadron sized detachments served their annual camps in many overseas theatres carrying out engineer construction tasks as well as parachuting with Canadian, French, German and Italian forces. In 1964, the Regiment went to camp in Aden and it was here that two of the squadrons were attacked on the Dhala Road near the Yemen frontier by enemy tribesmen. Two men, including one squadron sergeant major, were killed. The regimental doctor, who risked his life to rescue two badly injured casualties in the open, was subsequently decorated for gallantry

(with an MBE, as the unit had not been embodied for active service). The following year, a composite force based on 299 Squadron served similarly in Little Aden.

The regiment ceased to exist in the reorganization of 1967 and was reduced to one squadron, retitled 131 Independent Parachute Squadron RE(V), with three troops and a support troop. Overseas camps continued over the next few years in Europe, the Gulf, Africa and Canada. 1977 saw the final demise of both the Regular and Reserve Army parachute brigades, but the volunteers in the TA squadron were anxious to retain their Special Forces role and it was something of an honour, therefore, when the Royal Marine Commando Forces accepted them into the order of battle of 3 Commando Brigade. The squadron, now in a green beret, but retaining its parachute capability, did not move its headquarters from Kingsbury and its troops stayed in Hull, Grangemouth and Birmingham.

The Engineer and Railway Staff Corps

A unique volunteer unit, this Corps had originally been formed in 1865 at a time when there were many different private railway companies and by the period with which this volume is concerned consisted of sixty officers recruited mainly from managers and civil engineers in British Rail and specialists in road, railway and port design and construction. Membership, which was by invitation only, was drawn invariably either from Chartered Engineers or directors of firms and nationalized industries and included presidents of leading engineering institutions. The Staff Corps could thus carry out its prime function of providing advice to the War Office with authority and expertise. The purpose of the Corps remained largely unchanged thereafter, though the constitution was amended in 1970 and again in 1972 to enable new members to be recruited from a wider professional base, particularly in mechanical and electrical engineering and transportation. Its members performed no military duties and received no pay, but were a most helpful source to which the E-in-C could turn, particularly when financial pressures on military development were restrictive or defence research establishments did not have the necessary resources. During this period, for example, members gave valuable advice on a wide range of subjects including defensive works for use in Northern Ireland, rapid repair of airfield craters and the training of officers at the RSME.

FOOTNOTES TO CHAPTER XIV

1. The total loss of stores after this eight week period, involving more than 400 men and much plant and equipment, was valued at less than £10.
2. One Commander of CVHQ working in his office in Minley Manor was informed by his Chief Instructor that his presence was urgently required on Hawley Hard if the loss of one complete STRE (Petroleum) from his order of battle was to be averted. At that time there was a preference amongst many male civilians for long hair, but the British Army, unlike some European counterparts, was not prepared to countenance hairnets. One of the STRE Corporals had arrived at Hawley with shoulder-length hair and been ordered by the Regular RSM to have it cut by the camp barber or be put 'inside'. The corporal had replied not only in what he considered appropriate language but also by threatening to lead the entire Team off the hard never to return. After what must be one of the few recorded instances of a brigadier and a corporal conducting negotiations on a bridging hard about two inches of hair, an honourable compromise was achieved. The two inches came off, but only on condition that the owner was given the time off to return to his own barber.
3. Lieut Colonel Peter Manning, a geologist, qualified for a Northern Ireland General Service Medal in this way. He was also sent to the Oman to site wells during the rebellion against the Sultan and here he was given the direct order "not to be killed" because it was felt that the presence of a TA officer in the combat zone could have been deeply embarrassing for the government of the day.
4. The changes in title of these formations over this period betrays some indecision. They were identified as Groups in 1961, changed to Brigades in 1967, reverted to Groups in 1978 and four years later were once more Brigades.
5. Extracted from "Some Reflections" in 72 Engineer Regiment official history.
6. Queens Regulations for ceremonial precedence placed the Royal Monmouthshire Royal Engineers (Militia) immediately after all Regular Army corps and regiments, before even the Honourable Artillery Company and the units of the Territorial Army.
7. The cap badge was designed in 1938 by Colonel H M Everett ERD DL, who served with the regiment for thirty-three years before retiring as Honorary Colonel in September 1964.
8. That in 1971 was memorable for the regimental band's first participation in the town Schützenfest and the - unconnected - report by a local following a traffic mishap to one of the regiment's officers "Von off your land-cars iss on its upstairs".
9. Recruiting in the first years was helped considerably by the determination of the new CO Lieut Colonel A N Brearley-Smith that as soon as possible annual camp would be held in the sun. His wish was granted when the whole regiment went to Cyprus in September 1970 to complete a variety of worthwhile local tasks and the unit's efforts were further rewarded by a

visit from Raquel Welch who happened to be filming nearby.

10. One officer remembers being issued with a pistol and ten rounds to protect his squadron headquarters. The rounds were boxed, wrapped in paper and heavily sealed. He was informed that he was under no circumstances to break the seal until he was fired on.

CHAPTER XV

TRAINING

THE TRAINING POLICY - THE TRAINING ORGANIZATION - OFFICER TRAINING - Young Officers - Degree Training - Professionally Qualified Engineer Training - Staff Training - SOLDIER TRAINING - Introduction - Training Brigade - The Training Regiments - The Haynes Medal - The Junior Leaders Regiment - The Army Apprentices College, Chepstow - Manning the Training Organization - DIVER TRAINING - SURVEY TRAINING - Officers - Soldiers - Civilians - THE REBUILD AT CHATHAM - THE REBUILD AT HERMITAGE

THE TRAINING POLICY

With the ending of National Service in 1960 came the end of the burden of training a constant flow of short term recruits. Simultaneously, the loss of responsibility for Works Services meant the departure of many of the opportunities for the Corps to practice building construction and general civil, electrical and mechanical engineering. The time was therefore ripe for a major reappraisal of where precisely the emphasis should lie in the training of officers and soldiers for the new all-Regular Army. In particular, the need for all officers to have degrees - as had been the case before the war - and for all soldiers to have artisan trades had to be addressed. Some of the debate had been aired publicly in an article written by Brigadier J B Brown and published in the RE Journal[1] in 1958, and the subject was discussed at some length at the subsequent Engineer-in-Chief's Conference.

At the opposite ends of the spectrum of this debate lay those who felt that the whole purpose of the Corps was to provide skilled field engineer support for the Army only, and those who believed that its standing in the eyes of that Army was dependent upon the Corps being demonstrably manned by professionally qualified engineers. Though it was recognized that the primary aim of the RE must be to assist the Army in its operations in war, even that prerequisite was confused by the conflicting demands of the two categories of war envisaged at

World War Two beach mines being exposed on Mundesley Cliffs, Norfolk, by waterjetting.
(Courtesy Soldier Magazine)

Captain P T Carroll and Warrant Officer N D Humphreys defuzing a World War Two German bomb in West Barr 1971

Mundesley Cliffs, Norfolk, &Capt P T Carroll and WO N D Humphreys

Nissen huts constructed by troops from 11 Engineer Group at Skopje after an earthquake 1963

Tunnelling in Gibraltar 1964

Nissen huts constructed at Skopje & Tunnelling in Gibraltar 1964

Surveyors of 19 Topographical Squadron in Aden.
(Courtesy Imperial War Museum)

A Forces Post Office in the field

Surveyors of 19 Topographical Squadron in Aden. & Post Office

Plant from 44 Field Support Squadron building a sports field as a MA□C project for the village of Niese in Germany

Sioux helicopter of 1 Division Air Troop being flown by Major N A F Edwards 1966

TA Sappers on demolition training. *(Courtesy Imperial War Museum)*

Plant from 44 Field Support Squadron, Sioux helicopter& TA Sappers

this time; General War in Europe and more Limited Wars (often to secure the hearts and minds of the people of undeveloped countries) elsewhere.

The views which emerged from the debate were that, as far as officers were concerned, there should be attractive career opportunities for both the civil and combat engineer alike, recognizing that the qualities produced by experience in either role could equally fit the holder for senior posts on the staff or in command. It was also deemed essential that all Other Ranks should obtain and practise a trade to make their careers as attractive to the new recruit as those offered by REME and R Signals. Not only was individual training steered towards these goals, but similar ideals were reflected in the revised order of battle of units by forming over the next few years specialized Airfield and, later, Construction Squadrons, in addition to those providing direct combat support.

THE TRAINING ORGANIZATION

In 1960 there were a number of Royal Engineer Training establishments in the UK, all under the technical direction of the Engineer-in-Chief except that the Director of Military Survey was responsible for the school at Hermitage.

The School of Military Engineering (as it was until 1962) at Chatham was the main focus. It consisted of a number of schools and units under a Headquarters in Brompton Barracks, including:

The Field Engineer School at Gordon Barracks, Gillingham, which taught subjects such as fieldworks and bridging to all ranks and also carried out trials on new equipment.

The Civil Engineering School at Brompton which again taught both officers and other ranks.

The Electrical and Mechanical School also at Brompton whose training concentrated on officers and NCOs selected to become Clerks of Works.

The Tactical School at Gordon barracks which taught engineering tactics, organization and staff duties to all ranks and also trained regimental signals instructors.

The Plant Roads and Airfields School at Kingshill Camp outside Rochester which trained officers in the use of plant, and taught plant trades to other ranks.

10 Trades Training Regiment at Kitchener Barracks, containing workshops in which training was given in the building and metal trades.

12 RSME Regiment in Brompton Barracks which administered the whole of the SME.

The Training Brigade comprising the Training Regiments and the Junior Leaders Regiment was responsible for the initial training of Sapper recruits and had its headquarters in Aldershot. **The Transportation Centre** consisted of two wings under a headquarters at Longmoor; a Railway and Movements Wing at Longmoor, manned by 16 Railway Training Regiment and responsible for training all ranks in railway survey, construction and maintenance, and a Port Wing at Marchwood, manned by 17 Port Training Regiment and responsible for training all ranks in port operating, construction and repair and inland water transport operating and repair. With the handover of Transportation to the RCT in 1965 the Centre ceased to be RE responsibility[2]. **The School of Military Survey** was at Hermitage near Newbury and trained officers in surveying and mapping and other ranks in survey trades training, while Headquarters Bomb Disposal Units (UK) at Broadbridge Heath near Horsham administered the **Joint Services Bomb Disposal School** which carried out BD training of officers and NCOs.

In general all these establishments continued their responsibilities for the whole of the period to 1980, though there were several changes in location mainly arising from the rebuild of the RSME in the Medway towns area and changes in nomenclature as new roles evolved. These are discussed in greater detail later in this chapter.

OFFICER TRAINING

Young Officers

The training of young Royal Engineer officers continued to be directed primarily for service at regimental duty, but in the

knowledge that this would be interspersed with tours either on the staff or as professionally qualified engineers.

As soon as possible after leaving The Royal Military Academy, Sandhurst (RMAS), and irrespective of whether they were already graduates or hoped subsequently to obtain an in-Service degree, all officers attended a basic Phase I Young Officer (YO) course at the RSME to prepare them for their first appointment as troop commanders. Initially the course lasted for 24 weeks and included basic combat engineer training, low level engineer tactics and command and administration at field troop level. Later, with effect from Intake 32 who passed out from the RMAS in December 1963, the syllabus was altered. All young officers completed 15 weeks training at the RSME after which potential degree officers were attached to units in the UK or BAOR for nine to 15 months before attending their degree courses at Cambridge or Shrivenham. Thereafter, they did further YO training during their vacations and a short refresher course at the RSME at the end. Meanwhile, non-degree officers remained at the RSME for a further five to six months.

During the 1960s a Phase II YO training course was also held at the RSME, lasting for nine weeks, to provide a brief introduction to Survey, Civil and Electrical and Mechanical engineering. In 1970, the training programme was further modified by extending the basic Phase I course to 32 weeks for the non-degree officer and replacing Phase II by a Post Degree Junior Officer (JO) course of six weeks attended by officers at university and a Supplementary JO course of 7½ weeks for those at regimental duty.

In 1972, by which time Sandhurst had reduced its Regular Officers' course from two years to one and had absorbed Mons Officer Cadet School (OCS) as well, the training at RSME was again reviewed. As a result, in 1973 a common Phase I course of 22 weeks was re-introduced for all officers with the Phase II course extended to 14 weeks for officers without degrees. However, a serious shortage of troop commanders caused this Phase II training to be suspended in 1976. In general, this pattern of training prevailed for the remainder of the period though a modular approach began to be introduced in January 1979.

Degree Training

Since the end of World War II, the extent to which a university

degree was regarded as an essential pre-condition to becoming a Royal Engineer officer was constantly under discussion. In general, however, whereas it could be argued that for the majority of regimental appointments such a qualification was no more than desirable - indeed, there were those who considered that three years regimental or field experience was more valuable than the same time spent struggling to achieve a poor degree - about half the officers in the Corps at any one time were employed in specialist posts such as Engineering, Survey and Weapons Staff in senior positions in which a degree was agreed to be essential. Furthermore, in the country at large an increasing number of bright young men in school sixth forms had their sights set on a university education. If recruiting was not to suffer the Royal Engineers therefore had to offer an attractive career for them. As a result, the proportion of young officers under the age of 37 possessing degrees varied from about 50% in 1960 to over 70% in 1977. In 1980, of the 114 regular lieutenants serving in the Corps, 70 either already had degrees or were studying at Shrivenham for them.

Professionally Qualified Engineer Training

At about the age of 28 some 12 officers per year were selected for employment in posts requiring either Civil or Electrical and Mechanical Engineering qualifications normally leading to Chartered Engineer status. These officers attended a six month course at the RSME followed by attachments to appropriate civil firms, not only in UK but in, for example, Australia and with the US Corps of Engineers, lasting for about 18 months. This system of training remained unchanged throughout the period; in 1962 the RSME course was rearranged to consist of separate Electrical and Mechanical streams, but the change was shortlived and the elements were combined again in 1967.

Staff Training

In common with those in the other "teeth arms" of the Army, it was in general a prerequisite for officers in the Corps to have attended a Staff Course before they could hope to hold senior non-RE command and staff appointments. At the age of about 30 such officers took the Staff College examination and a combination of these results and the candidate's academic qualifications determined whether they went to the Staff College

at Camberley and subsequently to posts on the General Staff, or to the Royal Military College of Science at Shrivenham leading to appointments concerned primarily with the development and provision of equipment. Inevitably, the number of Sapper officers who attended Shrivenham was small as many of those with a strongly technical bent had already opted for a Professionally Qualified Engineer (PQE) career within the Corps. By 1967, however, when the last Technical Staff Officers course was completed the two alternatives had been amalgamated into one Army Staff Course, during which all students attended a common Camberley component, and a period at Shrivenham whose duration depended upon their academic qualifications.

SOLDIER TRAINING

Introduction

As the end of National Service approached the Corps had to plan for a career structure to suit an all-regular Army with worldwide commitments in both field and works roles. In principle the aim was that all soldiers should be trained in both an artisan and combat trade and considerable efforts were made in the early 1960s to establish what the requirements might be for the various trade categories. These became the basis of training at three levels: Class 3 (the basic skill) for most sappers, Class 2 (more advanced) for senior sappers and junior NCOs, and Class 1 for senior ranks.

However, in the 1970s the system of linking trade levels with rank was shown to produce too much rigidity in the career structure and was also denying well merited financial rewards to the full career soldier who might never achieve senior rank, but nevertheless was a valuable and experienced tradesman. In this respect the Corps was at a disadvantage compared with other Arms, particularly the Infantry, who had had Class 1 rates of pay for private soldiers for some time. A revised career structure was therefore evolved under which, in virtually all trades, the Class 3 level was abolished and the command element removed from Classes 2 and 1 in both combat and artisan trades. Mandatory command and leadership courses were introduced at corporal and sergeant levels - taking place centrally - and junior NCOs cadres continued to be strongly encouraged at unit level.

These measures coincided with the systematic planning of training requirements introduced Army wide and adopted by the Corps through the setting up of the Training Development Team. Under this system jobs were analysed, job descriptions and training objectives were prepared centrally and approved by the Standing Committees on Royal Engineer Employments, one for artisan and one for combat trades.

Basic sapper training continued to be carried out during this period in Training Regiments which were concentrated in the Aldershot area. Apprentice training was conducted at the Army Apprentices College, Chepstow and Junior Leaders were taught at the Junior Leaders Regiment, Dover. All these units were coordinated and their training supervised by the Training Brigade Royal Engineers, also located in the Aldershot area, under whose Headquarters, established in 1949, the Aldershot Band and Mobile Display Team also came at this time. A separate staff was also established within the Headquarters Training Brigade for the training and administration of Reserve Army Sponsored Units.

Training Brigade

The Brigade was a Ministry of Defence (Army Department) controlled formation sponsored by the Engineer-in-Chief on behalf of the Director of Army Training. Its responsibilities included the basic military, combat engineer and driver training of all other ranks entering the Corps, certain combat engineer and driver upgrading, and the mounting of annual demonstrations for the Staff College, Royal Military Academy and Mons Officer Cadet School. In 1960, the training regiments under command were:

1 Training Regiment, Southwood Barracks, Cove
3 Training Regiment, Guillemont Barracks, Cove
4 Training Regiment, Gibraltar Barracks, Aldershot

The Commander Training Brigade had a number of other duties as was to be expected, including planning measures for Chief Engineer Aldershot District, but one of the more unusual responsibilities was as a Councillor on Aldershot Borough Council. As such, he acted as a nominated military representative of the Ministry of Defence on the Council and on

the Aldershot Borough Highways Committee. The appointment had its origin in the charter of incorporation of Aldershot as a municipal borough in 1922 when it was considered appropriate to have three military engineer officers on the council in view of the Army's responsibility for the many military roads and public utilities over more than half the borough. In 1960, the last CRE Aldershot acted as a military member; the first Commander of Training Brigade Royal Engineers to hold the post was Brigadier H W Kitson in 1962. Thereafter, the tradition was strengthened by the grant of the Freedom of Aldershot to the Corps in 1965 and successive Brigade Commanders continued to act as Councillors until the reorganization of local government in 1974 when Aldershot and Farnborough were combined to form the new borough of Rushmoor.

During the 1960s, a major rebuild of Aldershot Military Town was begun as a part of which the Training Regiments and Headquarters were to be relocated. Various sites were examined as alternatives to the Aldershot area, including Chatham, Longmoor and Wales (favoured by the Treasury), but the final choice became Hawley.

In 1971, the building in Aldershot occupied by HQ Training Brigade was required for the Garrison Headquarters as part of this reconstruction and it was fortunate that at this time Minley Manor became available. During and after World War Two the Manor had housed a division of the Staff College, but this moved back to Camberley in 1968. Various alternative uses for the buildings had been considered thereafter - including its suitability as a possible site for the relocation of the Royal Naval Staff College from Greenwich - but with its proximity to Hawley it seemed most appropriate for it to house the Training Brigade Headquarters. Because of the space available within the buildings it also became the RE Aldershot Officers Mess.

In 1973, in anticipation that the new barracks for the Training Regiments would be built nearby, the facilities at Hawley Hard for recruit watermanship and wet bridging training were modernized and the old wartime Nissen hutting replaced. The following year, work started on the Hawley project - the new Training Regiments' Barracks - to be called Gibraltar Barracks following demolition of the original of that name in Aldershot, at an estimated cost of some thirteen million pounds.

On 29 October 1976 Her Majesty The Queen laid the

foundation stone of the new Gibraltar Barracks during her third visit to the Corps in twenty years. In the same year, the title Training Brigade RE was changed to 11 Engineer Brigade, (although this was further amended to 11 Engineer Group in April 1978).

During the Autumn of 1979 the new barracks was occupied by 1 and 3 Training Regiments, the RE Band Aldershot and elements of 49 Explosive Ordnance Disposal Squadron and officially opened on 27 September 1979 by His Excellency General Sir William Jackson Governor and Commander-in-Chief Gibraltar accompanied by Sir Joshua Hassan Chief Minister of Gibraltar. Over the next three years, as a result of unforeseen changes in commitments including the need for accommodation for Sponsored units and the introduction of duality of posts whereby some permanent staff posts could be filled by males or females, three additional blocks were built, one of which was the first purpose-built unisex barrack block for the Army. Drivers undergoing training were accommodated in the new barracks, but their technical training still took place in very old buildings (some in Romney Huts) at Church Crookham, some seven miles from barracks. This housed 56 (MT) Training Squadron (in effect the remains of 4 Training Regiment) and Training Regiments Workshop REME.

The poor relations in all this rebuilding programme were the staff responsible for driver training. The instructional premises remained at Church Crookham in what had been Haig Lines which were subsequently reduced in size and renamed Martin Lines after Lieutenant C G Martin, awarded the Victoria Cross in 1915 while serving in 56 Field Company. Meanwhile, uncertainty prevailed as to whether or not driver training should remain an RE responsibility, an uncertainty which continued until after the end of the period with which we are concerned.

The Training Regiments

The primary role of 1 Training Regiment since its amalgamation in 1959 with 6 Training Regiment was the intake, selection and general military training of all regular recruits for the Corps, with a view to training them up to Field Engineer B ,III standard. Potential drivers and clerks were posted on to 4 Training Regiment for their specialized training after their first two weeks at Cove. Meanwhile, 3 Training Regiment was responsible for

the training of potential officers. Since 1949, this had amounted to the training of National Service recruits of grade "OR1" prior to their selection for Mons OCS, and a small number of regular potential officers prior to their joining the RMAS. However in February 1961, with the end of National Service looming, 3 Training Regiment was disbanded and the remaining responsibilities for potential officer training handed over to 1 Training Regiment. Soon after, on 1 July, 4 Training Regiment also ceased to exist, the task of training drivers for the Corps being continued by 56 (MT) Training Squadron, now part of 1 Training Regiment though remaining in Gibraltar Barracks.

With the demise of National Service great efforts were made to recruit the new all-regular Army and suitable stress was placed by the training organization on obtaining favourable press and television publicity. In June 1961 a staff reporter from the Daily Mirror, Mr Roy Blackman, was prevailed upon to "join up" with eighty other potential recruits at Southwood (unbeknown to anyone junior to the sergeant-major of the squadron concerned) and spent four days incognito in the camp as a recruit under training. The aftermath was a full page spread in his paper on 23 June 1961 giving a highly complimentary commentary on the discipline, food, pay and general conditions he had encountered. A similar venture in public awareness was started the same year by the holding of an annual combined Regimental "At Home" over one weekend at which old comrades and parents of recruits undergoing training were accommodated overnight by the training regiment. Several hundred visitors usually participated. Parents, relatives and friends were also encouraged to attend the routine recruit passing out parades. For the next few years, spurred on by such activities, recruiting went very well for the Corps.

Apart from routine training, the regiment also took part in various other activities. In June 1964 for the first time in fourteen years the Corps put on a display[3] in the Royal Tournament. 79 Recruit Party, supported by permanent staff from 2 Engineer Stores Depot and MEXE performed a ten minute long mock encounter with Fantasian rebels on a river obstacle. This necessitated the deployment of mineclearance, bridgebuilding, trackway laying and demolition skills - accompanied by much use of explosives to the huge delight of the audience. The following year on 25 May the regiment

paraded at the ceremony to mark the presentation of the Freedom of the Borough of Aldershot to the Corps.

Soon the successful recruiting campaigns of the early 1960s had placed such strains on the resources of a single training regiment that on 1 January 1968 3 Training Regiment was reformed, taking over command of 56 and 57 Training Squadrons and their respective responsibilities for driver training and Apprentice and Junior Leaders combat engineer training. In the same year the newly formed regiment put on another display for the Royal Tournament, this time encapsulating "RE - past and present". Ballooning, a box kite and even the RE football team of 1875 proudly carrying off the FA Cup were included, together with modern bridge demolition and construction - interspersed of course with the inevitable detonations and lots of smoke.

For the remainder of the period until 1980 the two training regiments existed side by side, their organizations largely unchanged except for the transfer of 56 Squadron from 3 Training Regiment back to 1 Training Regiment in 1977 and the compensating switch of 55 Squadron to 3 Training Regiment in the same year.

The Haynes Medal

A feature of the combat engineer upgrading course which was to continue on the re-formation was the presentation of the Haynes Medal to the soldier who was placed highest on each course. This award was in memory of Captain A W Haynes who, when on his way by troopship to Mauritius in 1896 with 43 Company Royal Engineers, received news of a rebellion by a group of native tribes in Matabeleland. Captain Haynes volunteered his services and those of his Company and led a Royal Engineers contingent of about forty men who took part in the attack on the rebels' main base. The action was successful, but during it Captain Haynes was killed. A memorial was erected to him in Rochester Cathedral and the balance of the fund was given to the Corps to provide bronze medals for the best sapper at fieldworks in each recruit party. Since 1951 it had been decided by the Council of the Institution of Royal Engineers that the medal should be awarded to the non-commissioned officer who passed out top of each Corporals Cadre Class (subsequently Combat Engineer BII Course) on the recommendation of the Commander Training Brigade.

The Junior Leaders Regiment

The Junior Leaders' Regiment was formed at Dover in December 1958 from the Boys' Squadron of 4 Training Regiment in Malta Barracks, Aldershot. The regiment initially consisted of three squadrons which subsequently inherited the numbers of disbanding field units. In December 1975 A Squadron was redesignated 54 Squadron and in April 1978 B and C Squadrons became 82 and 66 Squadrons respectively. To be eligible for entry boys had to be between 15 and 17 years old and to pass a personnel selection officer's interview. They were also required to be assessed as strong or adequate non-commissioned officer potential, able to produce good references as well as having to be "physically fit, at least five feet tall and ninety-six pounds in weight". Military subjects taught at the outset were drill and weapon training, fieldcraft and field engineering, while leadership training covered a wide field of simple skills including camping, expeditions, patrolling, elementary fieldcraft, first aid, improvised bridging and watermanship. Much of the material was similar to that in the Duke of Edinburgh's Award Scheme in which many of the boys took part.

Field engineer training to Class III standard in most subjects other than bridging was taught to all and a good grounding in a second trade was also given. For the latter the boy could choose from carpenter and joiner, fitter (internal combustion and pumps), painter and decorator, bricklayer, welder or clerk. Education took up almost a third of the training time and all boys were encouraged to achieve Senior Test Certificates. Instruction was divided into three terms each year and ten weeks annual leave was spread between these terms.

The main aim of the teaching was to provide every opportunity for the boys to use their initiative, practise exercising responsibility for small numbers of other boys and to be physically stretched. With this in mind various activities and expeditions were encouraged, one of the most spectacular being the occasion in May 1960 when the entire regiment canoed across the Channel to France. On completion of their training it was anticipated that they would be selected to command a section in a field squadron, having had a sufficiently sound foundation to be promoted in due course to non-commissioned and warrant officer rank.

Over the years the content of the course was modified to meet the changing needs of society and the Army. One of the main problems was that whereas a boy had to leave the Regiment by his eighteenth birthday and enter adult service, after the school leaving age was raised in 1973 an increasing number were not entering until after they were sixteen. Thus some could attend for as few as four terms while others were present for nine, calling for much flexibility in the syllabus. With the march of time changes in trades training were continually taking place and by 1971 fitting was no longer an option while radio user and licensed driver had been introduced. However, by the end of the 1970s all such training had been reduced to combat engineer BIII standard only. In 1978 the intake dates were revised to June, October and February in order to match the school leaving dates more closely and by this time between four and five hundred recruits were successfully completing the course each year.

The Army Apprentices College, Chepstow

The links between the Corps and Chepstow, well established in the 1950s, became even closer at this time. The school had been established before the 1939-1945 war to train Army Apprentices with a view to their becoming senior NCOs, warrant officers and commissioned officers in their Corps and by 1960 the two year course devoted about half the instructional time to technical training and the remainder to education and military matters. Technical content was the responsibility of the Engineer-in-Chief, implemented by Commander Training Brigade, and successive Commandants from 1968 onwards were all RE officers. Since the return from Harrogate of the survey trades in 1962 the majority of students were RE too, with the remainder RCT marine engineers and RAOC ammunition technicians. In 1966 the school changed its status and became the Army Apprentices College, Chepstow. It remained as such throughout the years with which we are concerned and continued to be the main source of future Clerks of Works for the Corps.

Manning the Training Organization

The special characteristics of life in the training organization required particular treatment for manning the staff. While for the

administrative staff and commanders the posting could be regarded as a routine one in a career, the instructors were normally under special pressure. For example, in the training regiments a junior NCO instructor would be fully responsible throughout a recruit party's time for converting a civilian into a soldier, living close to his section and encouraging the recruit at a very impressionable stage. They therefore needed to be of high calibre. In nominating them, commanding officers had to balance the disadvantage to their units of losing high grade men against the advantage to the Corps of manning the training regiments properly and to the junior NCO the opportunity to earn his spurs.

The Junior Leaders Regiment and Army Apprentice College similarly needed a particular quality of NCO who could be a good influence on the boys, for whom it was frequently their first time away from home, in an environment where the work was hard but often repetitive. RE Manning and Records normally selected individuals recommended in their reports for boys units and kept tour lengths down to two years to ensure freshness of approach.

DIVER TRAINING

A small number of Royal Engineers had regularly been trained as divers, primarily for tasks within Transportation such as cutting and welding under water in port operations. By the end of the 1950s the tactical scene particularly in North West Europe was changing as more vehicles with a limited water crossing capability were introduced. The area of operations of 1 (BR) Corps included many canals, rivers and streams and the need arose for many more sappers to be trained as shallow water divers for these obstacles to be examined in detail. Much of the training had hitherto been carried out by HMS *Vernon*, but the particular requirements of the land battle led to the establishment of the RE Diving School at Marchwood on 1 January 1961. At this time 17 Port Regiment assumed full responsibility for the basic training of both conventional and shallow water divers but with the transfer of responsibility for transportation from RE to RCT in 1965 technical direction of diver training was assumed by the RSME.

SURVEY TRAINING

Officers

The main course run by the School of Military Survey at Hermitage near Newbury for officers was the Long Survey Course, later redesignated the Army Survey Course. It had been designed in 1948 to provide formal training for those Royal Engineer officers selected to specialize in survey for the remainder of their careers, and covered the most up to date technology in field and air survey, cartography and map production. The aim remained unchanged, but with advances in technology the length of the course gradually increased from a year to fourteen months. However, in 1963 the content was reviewed and the duration returned to one year, though officers from the UK, Australia, Canada and the United States remained for a further six weeks instruction on advanced topics. Successful RE students were awarded the military qualification "SVY" and were granted exemption from the final written examinations of the Royal Institution of Chartered Surveyors. In addition to the Army Survey Course the arrangements continued for selected officers to attend one year courses in geodesy at Oxford University, photogrammetry at University College London and printing at the London College of Printing and in 1971 the range of these specialist advanced courses was extended to include cartography at Glasgow University.

It had always been Corps policy that young regular officers should receive at least a basic introduction to topographical survey, and such training was arranged to suit their degree courses; those at Cambridge University attended a five week course at the School, those at the Royal Military College of Science spent varying periods at the School depending on availability of instructors at the College. But during the sixties there was continual pressure to get young officers out to units as quickly as possible and during 1961 and 1962 such officers received no survey training. However, the five-week course was re-introduced in 1964 and was subsequently reduced to one week in 1968. By 1974 the one-week course had been reduced to two days and in 1979 this was reduced to one.

Officers at the Royal Military College of Science continued to receive two weeks training in photogrammetry, and several special courses were designed to provide similar instruction for

RN and RAF officers, and a course in desert navigation was introduced for the Special Air Service. By 1980 students from thirty-three nations had attended the Army Survey course, many of whom subsequently reached positions of prominence in their respective national survey organizations.

Soldiers

The ending of National Service removed the need to provide basic technical training for some 300 soldiers per year. Most regular basic tradesmen had been recruited through the Army Apprentice College, but there still remained a requirement to carry out basic training for a number of adult recruits, and with an all regular army it became increasingly important to provide formal intermediate and advanced training for all survey employments. In 1960 the introduction of technician employments required technician training to be carried out in parallel with existing trade training. However, there were difficulties in creating a mechanism for assimilating tradesmen into the technician employment structure. As an initial step the School assumed responsibility for all employment testing; examination papers were prepared and sent to units, candidates' scripts, together with commanding officers' recommendations, were returned to the School for assessment, and thus a uniform standard for each class in each employment was achieved throughout Military Survey. Nevertheless, with the relatively small overall numbers of personnel in Military Survey it took some fifteen years before the obsolete trades were phased out and all remaining tradesmen remustered as technicians.

A significant development in 1973 was the introduction of the 27 week Survey Staff Specialist Course for warrant officers and senior non-commissioned officers. It was designed to provide cross-disciplinary training by including at least one student from each of the different survey employments, thereby enabling them to learn from those outside their own specialization.

The all Arms general duty draughtsmen courses which had been introduced some ten years earlier continued throughout this period and began to include members of the Womens Royal Army Corps who, in the absence of other suitable quarters, were accommodated in the officers' mess lines; an unavoidable situation which nevertheless gave rise to some speculation among the soldiers! The title of the course was changed to

Draughtsman Specialist in 1971. Also from 1971 the School provided part of the training for the Surveyor Engineer Class 1 course sponsored by the Royal School of Military Engineering.

In line with the similar activity mentioned earlier in this chapter, a small Training Development Team was established in 1974 to introduce the systems approach to training to cover all six soldier employments. Following the acceptance by Military Survey of the responsibility for map reading training throughout the Army, the Training Development Team also undertook the design of the map reading segment of the common military syllabus, the definition of the related training objectives, the preparation of lesson plans and the design of supporting graphics. The next step was the design of an all Arms map reading instructors course with the aim of training instructors to conduct map reading training in their respective units to the defined standard of the common military syllabus. By 1980 the bulk of the work was complete and the first instructors course began on 9 June that year.

During 1976 it was agreed by the Technician Education Council that students who had successfully completed many of the survey training courses would be eligible to receive the Council's appropriate Higher Certificate or Diploma and similar recognition was also granted subsequently by the City & Guilds of London Institute to students who had successfully completed certain photographic and printing training. Such recognition proved to be a powerful recruiting incentive and useful motivator during training.

Civilians

Whereas government sponsored civilians had long been accepted on the Army Survey course in preparation for appointment to the Colonial (later Overseas) Survey Service, the first course for Military Survey civilian employees of the Mapping and Charting Establishment RE was introduced in 1967 to teach elementary air survey to basic grade cartographic draughtsmen. In 1969 the Ordnance Survey requested Military Survey to set up a range of courses to provide additional training for their middle management grades whose experience prior to promotion had been essentially technical. Initially four types of course were designed to meet the requirements of different grades of students, with durations varying from ten weeks to eighteen weeks and later further courses were added.

THE REBUILD AT CHATHAM

Many of the buildings housing the RSME in Chatham dated back to 1804. Over the next century and a half many workshops, boiler houses and outbuildings had grown up in the Brompton area. Gordon Barracks, housing the tactics and field engineering classrooms, was based on a wartime hutted camp and the workshop facilities in Kitchener and Brompton having been built in 1860 were becoming dated indeed. By 1960, therefore, plans were drawn up by W S Atkins Partners for the design of new barracks to be built on the north bank of the river Medway at Chattenden to replace Gordon Barracks, and for brand new workshops to be established within the Brompton complex. The Chattenden complex was also designed to include the rehousing of the Joint Services Bomb Disposal School from Horsham. As part of the whole project improvements were to be made to the residential accommodation, messes and training amenities. A £3 million contract was duly awarded to Wimpey & Co on behalf of the MPBW which effectively required the demolition of many of the old buildings and the gutting and modernization of the interiors of the remainder. The outward appearance of the structures surrounding Brompton square remained as did the Crimean Memorial Arch, the Institution building housing the headquarters, and the Electrical and Mechanical School. Elsewhere, however, modern well lit workshops, messes, stores and classrooms appeared. Clearance of existing structures was not always easy as over the years a warren of tunnels had been excavated beneath much of the site. Other hazards encountered included the sheer size of some of the old constructions. The old carpenters shop, for example, built by convicts in the middle of the nineteenth century was bounded by walls five feet thick at their base and roofed with hand forged steel trusses one hundred feet in length. The major works throughout the area were started in 1964 and the final handover to the Corps was made by the contractor in February 1968.

THE REBUILD AT HERMITAGE

In 1972 after many years of vacillation in the Ministry of Defence the decision was taken to rebuild the School of Survey at Hermitage. Work started on site in May 1976 and was marked by the Director of Military Survey, Major General J Kelsey,

personally demolishing one of the old brick huts using a large excavator provided by the contractor. New buildings were occupied as they became available following a carefully prepared schedule which enabled the School to function normally throughout the whole of the rebuilding programme. Lieut Colonel J S Coulson, who had been Commandant, was appointed Project Liaison Officer and much of the close cooperation achieved between the Property Services Agency, the contractor and the School staff must be attributed to him and his expertise.

On 27 June 1980 the rebuilt School of Military Survey was formally opened by Her Majesty the Queen, Colonel-in-Chief of the Corps of Royal Engineers, as is described in greater detail in Chapter XVI.

FOOTNOTES TO CHAPTER XV

1. Under the title "Whither the Corps", RE Journal December 1958, and followed up in that of March 1959.
2. See Chapter II.
3. Conceived by the Chief Instructor, Major A G C Jones.

CHAPTER XVI

CORPS AFFAIRS

CONTROL OF CORPS AFFAIRS - ROYAL OCCASIONS - PUBLIC DUTIES - GRANTING OF FREEDOMS - THE INSTITUTION OF ROYAL ENGINEERS - Composition and Role - The Museum and Library - Centenary - THE ROYAL ENGINEERS ASSOCIATION - HEADQUARTERS MESS FIRE - BANDS - ADVENTUROUS ACTIVITIES - SPORTS - General - Yachting - Mountaineering.

CONTROL OF CORPS AFFAIRS

In 1961 a small Corps Headquarters staff was officially established, consisting of the Treasurer Corps Funds Account, the Head Librarian, Curator of the Museum and Technical Adviser to the board of control of the "Sapper" magazine. The holders of these posts, all within the responsibilities of the Institution, had previously been serving officers on normal tours of duty. With the formation of the new headquarters they were thereafter filled as full time appointments. With the concentration of Corps affairs being centred at Brompton much of the day to day burden of running them on behalf of the Engineer-in-Chief fell on the RSME and in 1976 a regular post was established of Regimental Colonel to relieve the school's headquarters of some of the load of Corps matters. In 1979 he also became responsible for recruiting. Although his responsibilities impinged on RE Institution affairs, both the latter and the Royal Engineers Association (REA) were by charter legally independent bodies and were not therefore part of Regimental Headquarters.

Overall direction of Corps affairs was provided by a Corps Committee, chaired by the Chief Royal Engineer, and whose members included the E-in-C and Commandant RSME. This committee was disbanded in May 1978 and replaced by a two tier management system, a Chief Royal Engineer's Committee to provide top level policy, and an E-in-C's Regimental Committee to implement it and coordinate day to day affairs. In addition both the Institution and the REA had their own councils and committee structure.

ROYAL OCCASIONS

There were several occasions during this period when the Corps was honoured either by an official visit by Her Majesty The Queen in her capacity as Colonel-in-Chief or by RE participation in a Royal event. One such example of the latter was on 19 October 1960 when representatives of the newly formed Gurkha Engineers Pipe Band took part in a Royal Review held in the garden of Buckingham Palace during the State Visit of the King and Queen of Nepal. On 30th March the following year the Queen and the Duke of Edinburgh visited Rochester to mark the 500th anniversary of the grant of a charter to the city and the military requirements of the visit were coordinated by the SME. Among these were the lining of the route by units of the Territorial Army, including 590 (Kent) BD Squadron, and the provision of an RE Guard of Honour at Rochester Castle.

In 1962 the School of Military Engineering celebrated its 150th anniversary. Although the Royal Warrant bringing the Royal Engineer Establishment into being at Chatham had been signed in April 1812 the principal festivities connected with the anniversary were held in July. To mark the occasion the Commandant, Brigadier E F Parker, sent the following message to Her Majesty the Queen:

> "In 1812 the Prince Regent, in the name of and on behalf of King George III, approved the Royal Engineer Establishment for the "Instruction of our Corps of Royal Military Artificers, Sappers and Miners as well as the Junior Officers of our Corps of Royal Engineers in the duties of Sapping, Mining and other Military Field Works." The Commandant and all ranks of the Establishment - now the School of Military Engineering - on the occasion of its 150th anniversary send to Her Majesty The Queen, their Colonel-in-Chief, their loyal greetings and heartfelt good wishes."

To which Her Majesty most graciously replied:

> "I send my sincere thanks to you and all ranks of the School of Military Engineering for the kind message of loyal greetings and good wishes which you have sent to me on their behalf on its 150th anniversary. I warmly congratulate

them on the completion of their first 150 years and send my good wishes for the future of the School."

Elizabeth R, Colonel-in-Chief

On Friday 20 July 1962 His Royal Highness the Duke of Edinburgh paid an official visit to the School, arriving by helicopter at the United Services' Sports Ground, Brompton. After inspecting a guard of honour on Brompton Square His Royal Highness attended a luncheon in the Headquarters Mess in the presence of one hundred and eighty officers and their ladies, including eight previous commandants of the School. After the Loyal Toast the Duke announced that Her Majesty the Queen, as a birthday present, had graciously bestowed upon the School of Military Engineering the Royal title. Although this particular gift had been kept a closely guarded secret, some surreptitious preliminary work had already been done. Almost as soon as the announcement had been made a glistening new name board appeared by the Gymnasium to indicate the way to the *Royal* School of Military Engineering. In the afternoon His Royal Highness visited the Construction School before flying to Chattenden to lay a Commemorative Stone for a new barracks to house the Combat Engineer Group of the School.

But one of the most memorable occasions took place on 28 March 1968 when the Queen graciously visited the RSME on the completion of its modernization. On a day of glorious spring sunshine Her Majesty accompanied by His Royal Highness the Duke of Edinburgh arrived by train at Gillingham and were escorted to Brompton Barracks to be met by a large reception party and Guard of Honour. Their tour then included the Institution Building foyer where wives of certain senior officers were presented to them, and the library to meet representatives of all the Corps major organizations and activities. The Commandant then briefly outlined the reasons behind the modernization and presented the chief personnel from MPBW and the contractors responsible for carrying it out. The Royal Party visited the Workshops, the Junior Ranks Club, a display of Corps activities on Brompton Square and the Museum, lunching in the Headquarters Mess before their departure.

An unusual event took place on 1 May 1969 when the Ordnance Survey for the first time since it was formally constituted was visited by a reigning Sovereign. The occasion

was the official opening of the new headquarters at Southampton by the Queen and as at this time the Director-General and many of his staff were serving Royal Engineers the Chatham Band and a number of distinguished RE guests were present. Her Majesty paid a similar honour to the Survey Branch when she visited Hermitage on 27 June 1980 to open the new barracks of the School of Military Survey. After an informal reception and lunch the Chief Royal Engineer invited the Queen to unveil a commemorative plaque and presented her with gifts including illuminated maps of the Sandringham estate. She spent an hour touring the Instructional Wing, speaking to many of the staff and students before attending a garden party in the sports field prior to taking tea and her departure.

PUBLIC DUTIES

The Corps was greatly honoured in 1971 when for the first time a detachment was provided to perform certain public duties in London. For nine days during the first three weeks in December 50 Field Squadron provided the Queen's Guard, the Tower Guard and the Bank of England Picquet and were warmly congratulated by the Press for the manner in which they did so. 20 Field Squadron carried out similar duties in October 1974.

GRANTING OF FREEDOMS

Over this period a number of boroughs and cities continued the ancient custom of granting military units the right of entry to their streets marching with bayonets fixed and colours flying, usually to mark their long association with a particular neighbourhood. The Corps was honoured on many such occasions and a table listing such Freedoms granted to both Regular and Reserve Army units is at Annex C. On many such occasions a commemorative scroll or casket or similar momento was handed over to the unit concerned for its permanent retention.

THE INSTITUTION OF ROYAL ENGINEERS

Composition and Role

The Institution, which had been founded in 1875 and received its Royal Charter in 1923, remained during this period an

autonomous body within the Corps, answerable to its own Council. The President was a retired senior officer and the two vice-presidents were by tradition the Engineer-in-Chief and a retired brigadier in order to cater for the interests of both the serving and retired members of the Corps. This representation was further reinforced by a balance of retired and serving officers on the council.

The responsibilities of the Institution, placed upon it by the Corps under the Charter, were to run the Museum and Library and produce the Institution publications. These latter were normally the Royal Engineers Journal (quarterly) and its monthly Supplement (known colloquially as the "Pickaxe"), the Royal Engineer List (annually) and Corps History. The Institution was not responsible for the Sapper magazine which had a separate committee of management, although in 1979 because of cuts in the Corps staff the Corps Librarian was appointed its Editor. Certain Corps trust funds were also administered by the Institution, the most significant of which was the Kitchener Scholarship Fund to provide financial help for the schooling of children whose fathers of any rank in the Corps had died during their service. During the period of this volume fifteen such families were helped in this way.

By 1980 the list of other awards administered by the Institution was:

- The Institution Gold Medal, awarded very occasionally as a mark of rare honour for some major work connected with the advancement of historic, scientific or technical knowledge related to the Corps.

- The Institution Silver Medal and Alan Izat Prize for the best all round young officer on each YO course.

- The Collinson Prize for a particular exercise on each YO Course.

- The Montgomerie Prize for the best contribution to the RE Journal on a professional subject from an officer not above the rank of lieut colonel.

- The Arthur Ffolliott Garrett Prize for the best contribution to an Institution publication on the technical aspects of logistic engineering.

- Best Article of the Year Prize.

- The Armstrong Silver Medal for the top RE officer on the degree course at Shrivenham.

- The Durand Medal, awarded every third year to a member of the Queens Gurkha Engineers for particularly meritorious work as judged by the Major General Brigade of Gurkhas.

- The Fowke Bronze Medal and Stokes-Roberts Prize for the student passing out top of the Clerk of Works Course.

- The Haynes Medal, mentioned in the previous chapter, for the best student on the Junior NCO/Section Commander course in the Training Brigade.

- The Coopers Hill Prize, awarded every third year under the auspices of the Institution of Civil Engineers for a prize essay competition.

- The Rainy Anderson Prize for the best end-of-course paper from the professional engineer training course.

It was also intended in the Charter that the Institution should provide an interface with other professional learned societies. The chief manifestation of this was a programme of Joint Professional Meetings that were held from time to time with the Institution of Civil Engineers and other similar bodies.

By the early 1970s financial planning had become a major problem. Membership of the Institution had always been voluntary and inevitably not every officer subscribed. In 1975, therefore, to overcome the inequity of a system which brought benefits to people regardless of whether or not they had paid for them, and to provide a more assured income, a new system of financing the Corps affairs was introduced. Officers were invited to subscribe to Corps funds by direct deductions from their pay at source. Part of this subscription, three quarters of a day's pay, went to the Headquarters Mess, an entitlement which the Engineer-in-Chief was empowered to make under Queen's Regulations. The remainder, consisting of one and one half of a day's pay, went into the RE Officers Charitable Fund and was

divided equally between the Institution and the other commitments to be provided for from Corps funds, allocated as required by the budget. Retired officer members of the Institution continued to pay subscriptions direct.

By this time both the Charitable Fund and the Institution had become registered charities and thereafter the Institution's finances improved sufficiently for it to meet its expenses, the bulk of which arose from publications. Meanwhile, throughout the period there was a recurring debate about the aims of the Institution and its place in the Corps structure, but though modest changes occurred to its publications no radical moves were made to alter its basic purpose. There were widely divergent views as to whether it was an organization capable of exerting any real influence or was simply a means of maintaining contact between the serving and retired membership of the Corps. In general, the view prevailed that the Institution was a useful vehicle for the discussion of views and expression of opinions without the constraints imposed by virtue of a member's official position in, for example, a Ministry of Defence post. By and large freedom of expression was maintained in the columns of the Journal although, not surprisingly, there were many times when the Editor came under some pressure for publishing against an official line.

The Museum and Library

While the Kitchener Scholarship and the trust funds were generally self-financing from investments, the Museum and Library were dependent on grants from the General Fund. Fortunately unlike the Institution itself, both the Museum and Library were staffed at Ministry of Defence expense in recognition of the public service they provided, and so grants were required mainly only for the maintenance of the collections. Nevertheless, such grants were small, representing a mere 1.6 percent and 0.6 percent respectively of the Institution income.

During these years pressure was building up in the Corps to move the Museum to better premises than the attractive but inadequate original barracks chapel beside the Brompton drill square which had been its home since 1912. It was felt that the quality of the collection deserved a better setting, that provision should be made to preserve and display the larger items of equipment with which the Corps had earned much fame in the

20th Century such as bridging, tanks and earthmoving plant. Above all, it was felt that the whole collection should be made more readily available to the general public who might even be prepared to contribute to its upkeep through admission charges. At the end of this period several studies were put in hand to choose between possible sites, including Lower Upnor on the north bank of the Medway; Fort Amherst, the then derelict fortifications overlooking Chatham; and the Ravelin building, the original Electrical School for the SME on the edge of Brompton Barracks but with its own access off Prince Arthur Road, Gillingham. The story of the move of the Museum to the latter site in 1985 and its subsequent development will have to be told in a later volume.

Centenary

The major event for the Institution was the celebration of its Centenary in 1975 and this provided an excellent opportunity for wide discussions of the Corps role in both military and civil engineering. Early in the year an article was published in the RE Journal by the recently retired Secretary Brigadier J H S Lacey, in which he described the origins of the Institution and its role, and the climax of the year was the centenary meeting held on 27 November 1975 in the Institution of Civil Engineers, at which a presentation took place by three distinguished speakers on the past, present and future of the Corps. By the end of that decade the Institution had indeed reaffirmed its aims and set its pattern for its next century of existence.

THE ROYAL ENGINEERS ASSOCIATION

The RE Old Comrades Association had been founded on 12 October 1912 with the general aims of fostering esprit-de-corps among all ranks, circulating information about the Corps to help potential recruits, assisting in finding employment for ex-members and bringing to the notice of the RE Charitable Fund any deserving of assistance. In 1943 the word "Benevolent" was substituted for "Charitable". In 1952 when many survivors of World War Two were still in their twenties, the words "Old Comrades" were similarly becoming unfashionable and at the AGM held on 18 October it was unanimously agreed to change the title to "The Royal Engineers Association" (REA).

In 1966 after some seven years as Chairman REA, Major-General A J H Dove resigned and was succeeded by Major-General L I Wansbrough-Jones and a year later General Sir Frank Simpson was succeeded as President by General Sir Charles Jones. Shortly before leaving General Simpson had initiated a committee with the task of formulating a scheme for the amalgamation of the Royal Engineers Benevolent Fund (REBF) which was a limited company and REA within the framework of future Corps administration. The Committee, which was formed under the chairmanship of Major-General I H F Boyd and included Major-General Wansbrough-Jones (REA), Major-General G N Tuck (REBF) and Colonel G T E Westbrook, Deputy Commandant RSME, proposed that the charitable activities should be combined into one easily governable body, to simplify administration and to save costs. The resulting organization which emerged was a three-tier system comprising a Council meeting annually under the chairmanship of the President, a Management Committee meeting quarterly and a General Purpose Committee meeting monthly. In addition, there was a Benevolent Sub-Committee meeting monthly and a Finance Sub-Committee meeting quarterly. On 19 November 1968 the old REA was dissolved and immediately re-constituted in its new form and the Council was proud to learn that Her Majesty the Queen had graciously granted her Patronage to the new Association.

In 1969 a new organization for Headquarters REA was approved which provided for a Controller, a Deputy Controller and three clerks of which one would deal specifically with benevolence. Towards the end of 1969, after many years of service as Secretary REBF Limited and latterly the REA, Colonel Easton retired. In 1970 the new organization was implemented when the Council appointed Colonel R R L Harradine as the Controller with Captain L Thomas as Deputy Controller. By 31 March 1970 all the detailed financial work had been completed, including the liquidation of the REBF Limited and the first consolidated accounts were prepared as at that date. With the approval of these accounts at the AGM held on 10 October 1970 the amalgamation of the old REBF Limited and the old REA was finally completed. The hundred or so Branches in the United Kingdom were organized into Groups and, where distances dictated, Sub-Groups, each the responsibility of a Director or Assistant Director appointed by the Engineer-in-

Chief from senior RE officers of the regular or reserve Army. Many events were arranged at all levels which brought together serving and retired members of the Corps, their families and friends. Notable occasions were the REA weekends at Chatham and Aldershot.

On 27 October 1962 the Golden Jubilee Rally of the REA was held at the Royal Festival Hall, London. In the late afternoon there was a display of models depicting RE equipments and techniques and this was followed in the evening by a variety show which included the Chatham and Aldershot bands. The Guest of Honour was Field Marshal the Viscount Slim. Some 3000 Sappers, their families and friends attended this very memorable function. On the following day, Sunday 28 October 1962, some 500 REA members paraded on the Horse Guards parade for a Drumhead Service. The Parade, which included 42 Branch Standards, was commanded by Major-General C G Woolner. In addition to four contingents of REA members it included detachments representing 1 Training Regiment RE, the Army Apprentices School, Chepstow, the Duke of York's Royal Military School, Gordon Boys School and the Royal Hospital, Chelsea. The Service was followed by a march to the Cenotaph during which the salute was taken by the Chief Royal Engineer, General Sir Frank Simpson. At the Cenotaph wreaths were laid first by General Simpson and then by Major-General T H F Foulkes, Engineer-in-Chief on behalf of the Regular Corps, Brigadier E C R Stileman representing the Auxiliary Corps and Major-General A J H Dove on behalf of the REA.

From 30 April to 5 May 1963 21 members from widely dispersed Branches visited France at the invitation of the French Engineers Association. The party was led by Major-General Dove, Chairman REA and the programme included visits to Grenoble and Paris; this event proved a great success.

During the 1970s the REA derived considerable benefits from changes in the management of Corps affairs described earlier in this chapter. The Chairman REA became a member of the Chief Royal Engineer's Committee and the Controller a member of the Engineer-in-Chief's Regimental Committee. This representation, together with the very close liaison maintained between the offices of the Regimental Colonel and the Controller REA, both at Chatham, together with the existing Group and Branch organization, firmly established the REA within the concept of the Corps as a family.

In 1980, after serving for ten years as the new REA's first controller, Colonel R R L Harradine retired and was succeeded by Colonel G S Harris who had previously served on the Finance Committee. By the end of 1980 much had happened in the development and consolidation of the REA. There were 95 branches at home and six overseas; the finances were strong and benevolence had increased considerably in scope and thanks largely to the generosity of many serving members of the Corps the probable increase in demands in the future could be faced with confidence.

HEADQUARTERS MESS FIRE

The Royal Engineers Headquarters Officers' Mess building at Brompton Barracks, much of which dated back to the early nineteenth century, was included in the modernization programme carried out on the RSME barracks during the mid 1960s and described in Chapter XV. Sadly, a major fire broke out early on 3 December 1975 in a single storey link between the recently built kitchen block and the older building. The fire was of such intensity that before it could be brought under control it had severely scarred the beautiful dining hall, melting chandeliers and charring the roof trusses, ceiling and plasterwork. Most serious of all, the magnificent portraits hanging on the walls had all been damaged. There were seven old subjects: Lord Kitchener, the Duke of Cambridge, Prince Albert, Queen Victoria, Lord Heathfield, Lord Napier and General Gordon. Also hung was a recent portrait[1] of Her Majesty the Queen by W E Narraway which had only been presented to the Mess on 20 May 1971, and which was unique in that one of the Queen's corgis was shown beside her, the only Royal portrait to contain an animal.

A mess restoration committee was set up chaired by the Deputy Engineer-in-Chief (Brigadier C A Landale) and including the Deputy Commandant RSME (Colonel G S Harris), the President of the Mess Committee (Lieut Colonel D N Hall) and the Area Works Officer (J R Brown Esquire) to organize the repair work. A picture restorer M Leslie Esquire of Brasted was appointed and he found after careful cleaning that the heavy layers of varnish on the older paintings had provided significant protection against the heat and they could be restored, though

that of Her Majesty had been damaged beyond repair. Mercifully, however, it was in due course replaceable by the original artist.

After months of hard work by a wide variety of people and considerable support from the Ministry of Defence, the Property Services Agency, the Director of Ancient Monuments and many others including the RAF department responsible for certain accommodation stores such as carpets and curtains, the whole Mess was returned to its former glory some fourteen months later. A topping out ceremony was held on 18 February 1977 to which all the craftsmen and others who had worked on the restoration were invited and the mess reopened for normal meals six days later.

BANDS

An RE Brass and Reed Band was first established in 1856 at Chatham and its successor continued to be a purely Corps organization until 1948 when it became an established unit of the Army. The band had three components: a military band maintained jointly by public funds, corps funds and fees paid for civil engagements; an orchestra made up from members when not on duty with the military band, financed by earnings and an annual grant from the Headquarters Officers Mess, with the primary function of providing music at Guest Nights in the mess; and a dance band financed entirely by earnings from paid engagements. In 1949 approval had been given for the formation of a second band to be based at Aldershot and the two continued in existence throughout this period, playing not only at functions in this country but touring abroad in Germany and elsewhere. They provided, for example, the principal band at the Edinburgh Military Tattoo in 1973 and the following year played for Royal Duties at Buckingham Palace and at the Wembley League Cup Final. To celebrate the centenary of the Royal Engineers winning the FA Cup the combined bands played at the Cup Final in 1975. The orchestra played in some unusual locations including St Michael's Cave, Gibraltar where they accompanied the classical guitarist William Gomex in 1972. Several individuals distinguished themselves during this period including Major Brown who became the first Sapper to be Senior Instructor at Kneller Hall in 1961 and Sergeant Bosher

who left the army to join the Birmingham Symphony Orchestra as cellist in 1969.

ADVENTUROUS ACTIVITIES

In addition to the more conventional sports in which members of the Corps excelled and which are reported in more detail below, there were many enterprising individual successes ranging from Captain B C A Lee who led a team to complete the first intercontinental paraglide across the Dardanelles in October 1973, to Captain M Burgess who reached the summit of Lanying in the Himalayas at 22,900 feet alone without the aid of oxygen in May 1974. But probably the more widely known deeds were those of Captain (later Colonel) J N Blashford-Snell.

One of his earliest exploits was to lead a Service expedition to Ethiopia in 1964 to collect specimens for the Natural History Department of the British Museum which was planned and organized by the RMA Sandhurst. Subsequently the Emperor of Ethiopia expressed an interest that such expeditions should continue and two years later in 1966 the same officer mounted a scientific exploration of the gorge of the Blue Nile. This time the planning took place largely at the RMCS Shrivenham with logistic support from 3 Division Engineers. The venture became a major joint service cum civilian project known as the Great Abbai Expedition in which twelve Sapper officers and other ranks took part, facing extremes of heat and cold, torrential rain, snakes, mosquitos and attack from bandits, and which lasted throughout August and September.

Between 17 March and 1 June 1967 an expedition comprising 25 British servicemen and 11 civilian scientists went to Socotra Island in the Arabian Sea. The military members included Major R Emery and five RE junior ranks, who were primarily employed on survey tasks and minor roads construction. Despite the difficult internal security situation then prevailing in Aden the expedition was mounted from Middle East Command and supported by the RAF. The overland survey parties spent long periods of up to 60 days on foot in almost complete isolation completing a traverse of the island and other tasks, often based in camps on bleak limestone rock summits and using camels as road carriers. Much of terrain was volcanic and inhospitable and the climate harsh, with blazing sunshine

during the day. Others were engaged in surveys of coastal beaches and offshore areas using a dhow, canoes and Gemini craft. It was during one such coastal expedition that an inflatable craft containing a REME corporal broached in heavy seas and the NCO was thrown out, his right arm suffering multiple severe cuts from the outboard propeller in the process. With only inadequate first aid equipment available and the nearest doctor three days overland trek away, Major Emery and Corporal Paskell who had been in an accompanying Gemini set out in the dark in rough weather to collect the expedition medical officer from base camp. After several setbacks and with great personal courage they eventually managed to return with proper medical help to the scene of the accident to attend to the injured NCO and for their part in this operation were both awarded the Queen's Commendation for Brave Conduct. It was perhaps symptomatic of the arduous nature of the whole expedition and the significant part that Sappers played in it that of the five C in C's commendations awarded on its conclusion to service personnel, three were to members of the Corps.

In 1969 the Scientific Exploration Society were asked to send a team to the Dahlak Islands in the Red Sea off the coast of Ethiopia with a view to opening them up for tourism. Once again, the party which included scientists, photographers, surveyors and divers and an RE element particularly concerned with water supply and blasting, was led by Major Blashford-Snell. They remained for a month carrying out a detailed investigation into the facilities, underwater conditions, wildlife, botany and geology of the area.

In the early part of 1970 a British Expedition to the Air Mountains spent three months carrying out a scientific study in the southern Sahara. The party was led by Major D N Hall and other Sapper members of the joint services team included Lieutenants G C Parkes, A D Pigott and J W G Rogers.

Major Blashford-Snell also led the British Trans-Americas Expedition in 1972. The aim of this venture was to demonstrate that it was possible for wheeled vehicles to traverse the hitherto impassable section linking the North and South sections of the existing Pan American Highway in Panama, known as the Darien Gap, while at the same time carrying out a scientific study of the area. Many of the problems faced by any such expedition lent themselves to Sapper solutions and the team was heavily dependent upon hand tools, power saws, water purifiers, survey

Student divers at Marchwood. *(Courtesy Soldier Magazine)*

Recruits launching Heavy Floating Bridge at Hawley. *(Courtesy Imperial War Museum)*

Student divers at Marchwood.& Heavy Floating Bridge at Hawley.

The Headquarters Mess Fire 1975.

The dining room on the morning of 3 December

After restoration had been completed

The Headquarters Mess Fire 1975.& After Restoration had been completed

Runcorn Heavy Girder Bridge being built by 107 Corps Engineer Regiment (TA) on 5/6 February 1965

Captain Speedy about to fly to South Africa and back in the Flying Club's Piper December 1964

Rucorn heavy Girder Bridge & Flying Club's Piper Dec 1964

Ravelin. *(Courtesy Beken of Cowes)*

Junior Leaders on their double Channel crossing by canoe July 1964

Junior Leaders on their double Channel crossing by canoe July 1964

equipment, short span light weight ladders and inflatable rafts for their success.

SPORTS

General

One of the characteristics of the post war years already commented on was the increased leisure time available to the general public and when peaceful conditions prevailed similar expectations spilled over to the armed services. One outcome was the growth in the number of recognized sports in which all ranks could participate and the introduction of many new ones such as cycling, orienteering and parachuting. Increasing participation by all ranks, however, brought its own problems, particularly while traditional barriers of rank still prevailed, for example in messes, over matters such as post match entertainment. The Corps' participation in the main team games of hockey, cricket, rugby and association football continued to flourish and indeed in 1977 the captains of every one of these teams at Army level were Sappers. The previous year's University Boat Race Cambridge crew had also included two, Lieutenant M R Gritten at No 3 and Lieutenant R Harpum at Stroke.

Some activities fell by the wayside, usually because they were becoming prohibitively expensive. The Gliding club, for example, which had been very successful in its early years was placed in suspended animation in 1960 and closed altogether in 1968. A similar fate befell the Flying Club though its aircraft was retained for a time for sport parachute training. In contrast, opportunities for competitive skiing increased dramatically and as a result in 1961 Corps participation in the sport was separated from the mountaineering club of which it had hitherto formed a part, and was established as a club in its own right.

A less well known activity but one which grew enormously in popularity was canoeing. As early as July 1964 a double crossing of the English Channel was completed by twenty five canoes crewed by the Junior Leaders Regiment and Junior Tradesmen and throughout this time Sapper teams competed regularly in the gruelling annual 125 mile race from Devizes to Westminster. But perhaps the sport's most outstanding exponent was Corporal A Williams who had never paddled until he joined

the Army in 1969. In the course of the next ten years his enthusiasm and skill led him to secure over twenty places in various British team events and participate in three World Championships and two Olympic Games.

Until 1973 control of Corps sports was exercised by a Sports and Games Committee. It was then replaced by a Sports Board which exercised policy with particular reference to finance, but which was also specifically charged with reconciling any conflict between an individual's sporting potential and his posting, with its associated trade or promotion consequences.

For many years some sports such as athletics, swimming and boxing were run mainly on a unit basis only, without Corps team representation. The Saddle Club and Beagles were primarily local clubs at the RSME and in Germany although they boasted Corps status. Similarly, the Ski Club was mainly a BAOR organization. The awarding of Corps colours - usually in the form of ties or badges - was officially approved in 1965 for golf, skiing, rugby and tennis, and other sports followed suit thereafter. Corps games teams and representative activities received financial support from the Sports and Games Fund, the majority of whose income was derived from officers' subscriptions. Limited contributions were collected from soldiers through unit subscriptions, but they were only levied in the United Kingdom. In 1967 a Corps badminton club was formed and in 1969, as part of the policy of encouraging greater junior ranks participation in official sport, plans were laid for the formation of RE canoeing, swimming, water polo, squash, cycling, orienteering and free fall parachuting clubs. In 1974 rowing was reinstated as a Corps sport. For many years Corps golf had "officer only" participation and suffered from the lack of a "home" course, but was nevertheless actively supported.

Sailing

The Royal Engineer Yacht Club founded in 1846 was by far the oldest such club in the Services and had for years set many of the standards of sailing proficiency later accepted by other national yachting associations. By the end of the 1950s the growth in popularity of the sport had led to greater competition than ever before and it was becoming increasingly expensive to participate in it at the top level. With the limited financial resources available to the REYC it became vitually impossible therefore in the 1960s and 1970s to maintain serious

competition in RORC events.[2] The club, however, supported such events as the Round Britain and Round the World races. For example, in 1972 Lieut Colonel P H Brazier was placed sixth in the single handed Transatlantic race, in 1974 Captain A N Carlier skippered the Horn leg of the Round the World race on *British Soldier* and Major G C Philp did the same for the leg to Sydney. The Club's last major effort was when *Ravelin* competed for a place in the Admiral's Cup team in 1969 when she completed all the races but was not considered for selection.

Meanwhile, the Army Sailing Association had been set up after World War Two to cater for other ranks as an official Army sport and to meet the needs within the Corps the Royal Engineers Sailing Association was established in 1963. The Association acquired their first yacht, the 15-ton yawl *Petard*, three years later.

An event which will for long live in many memories was the Fastnet Race of 1979. An Atlantic depression swept across the course bringing storm force winds and mountainous seas causing four yachts to founder, nineteen others to be abandoned and fifteen lives to be lost. There were four REYC entries; *Right Royal of Upnor* skippered by Colonel J R M Hill, *Contessa Catherine* by Brigadier R W Dowdall, *Gay Gannet V* privately owned by General Sir Hugh Beach and *Assent* similarly by Major W W Ker. The first was rolled over to about 130 degrees and so badly damaged she had to be towed into Milford Haven; *Contessa Catherine* was similarly knocked down but suffered less damage and was able to make Newlyn; *Gay Gannet* eventually had to abandon the race and *Assent* managed to survive two knockdowns to take first prize in her class. This serves to illustrate that though the period may have witnessed a reduction in the competitiveness of the club on the international scene, it did not reflect any such decline in the resource and seamanship of its members.

The Warren Shield had been presented to the REYC by Major General Sir Charles Warren in 1898 to be competed for annually by cutter crews from the Royal Navy and the Corps. Entry was widened in 1964 to allow the police and fire services to participate and further extended in 1967 to allow any ship, Royal Marine detachment or Army unit within ten miles of Chatham Town Hall to take part. For the first time for ten years the trophy was wrested from the Senior Service by a Depot Regiment RE team in 1966, who repeated their success the

following year and again in 1971, 1976 and 1977.

The 1972 Olympic Yachting events were based on Kiel, home of the joint service British Kiel Yacht Club whose Commodore was traditionally the Chief Engineer BAOR. The Club was collocated with the Kiel Training Centre, a Sapper unit of 1st Division commanded by a major, responsible for teaching young servicemen to sail for adventure and young sappers how to dive professionally.

Mountaineering

In the late 1950s climbing was essentially an officer sport whose participants trained regularly in North Wales and on Harrison's Rocks near Tunbridge Wells. Latterly, however, all ranks were encouraged to participate and by 1980 under half of the active members of the Mountaineering and Exploration Club were officers.

In 1961 a Cambridge University team led by Lieutenant R E Langford scaled seven major previously unclimbed peaks on Baffin Island.

During the summer of 1973 four RE officers and one sergeant went to India to climb in the Himalayas as part of a series of expeditions used by the Army Mountaineering Association to assess equipment and select a team to climb Mount Everest later. When the actual assault was made in the spring of 1976 there were five Sappers in the team:

Major M W H Day
Major P B Page
Captain M G le G Bridges
Lance Corporal S Johnson
Lance Corporal Gamalsingh

In 1978 Major Day took an RE team which successfully climbed Trisul Two in the Himalayas.

FOOTNOTES TO CHAPTER XVI

1. Reproduced as the frontispiece to this volume.
2. The club was very active nevertheless in other spheres. For example, in June 1967 it played a major role in the hosting of an armada of yachts visiting Chatham for the 300th anniversary of the Dutch fleet's attack up the Medway. The festivities included a barbeque in the grounds of Upnor Castle House and

the reenactment of the attack by a destroyer from Holland sailing through the dockyard fire hose jets. A suitably mounted cannon ball of a calibre in use by the Dutch of that period which had been found embedded in the walls of Upnor Castle was used to provide the trophy for a challenge match between the visitors and the Medway yacht club.

TABLE 8

RESULTS OF CORPS TEAM MATCHES AGAINST THE ROYAL ARTILLERY

Season*	Cricket	Rugby	Hockey	Squash
1960	D	L	D	L
1961	D	W	L	L
1962	L	L	W	W
1963	W	L	L	W
1964	D	L	L	W
1965	D	L	W	L
1966	D	L	L	L
1967	W	L	L	L
1968	D	W	W	L
1969	L	L	L	L
1970	W	L	-	L
1971	D	W	W	L
1972	W	L	W	L
1973	L	W	W	W
1974	D	L	W	L
1975	D	L	W	L
1976	D	L	W	L
1977	W	W	W	W
1978	L	W	W	L
1979	D	L	L	W

*The year shown is that in which the season starts.

TABLE 9 MAJOR COMPETITION SUCCESSES BY RE UNITS AND TEAMS

1963	Army Hockey Cup	1 Training Regiment
1964	Army Lawn Tennis Champions	RE Lawn Tennis Club
1965	Army Basketball Champions	25 Corps Engineer Regiment
1966	Army Minor Units Small Arms Champions	9 Independent Parachute Squadron
1968	Army Hockey Cup	36 Engineer Regiment
	Army Judo Champions	Training Regiments
1969	Army Water Polo Cup	Junior Leaders Regiment
1971	Army Water Polo Cup (and in 1972 and 1973)	36 Engineer Regiment
	Army Swimming Cup (and in 1974)	36 Engineer Regiment
1972	Army Hockey Cup (and in 1974)	36 Engineer Regiment
1974	Army Lawn Tennis Champions	RE Lawn Tennis Club
1975	Army Cycling Champions	38 Engineer Regiment
	Army Orienteering Cup (and in 1976)	22 Engineer Regiment
1977	Army Squash Championships	RE Squash Rackets Club
1978	Army Major Units Cricket Cup	Training Regiments
1979	Methuen Cup Bisley	RE Rifle Association
	Army Association Football Cup Final	Training Regiments
	Army Badminton League	RE Badminton Club
1980	Inter Unit Champions Bisley	RE Rifle Association

TABLE 10 MAJOR COMPETITION SUCCESSES BY INDIVIDUALS

1963	Army Bantamweight Boxing Champion (and again in 1965)	Cpl Rea
	Army Middleweight Boxing Champion	LCpl Sutherley
1965	British Cross Country Ski Champion	Cpl Main
1966	Winner World Hornet Championships (Sailing)	T G Wade
1967	Army Heavyweight Boxing Champion	Cpl Carslake
1968	Olympic Bronze Medal (Sailing)	S Jardine
1969	Army 100 yards Freestyle Swimming Champion	Spr Gibson
1972	Army Pistol Champion (and again in 1978)	S Lane-Jones
1973	Army Ski Champion	D Reynolds
1974	Inter Service Small Bore Champion (and again in 1975)	B J Warwick
1975	Army Cross Country Champion (Running)	J Henry
1976	Army Golf Champion	P Merry
1977	Army Orienteering Champion	P Sharples
	Royal Tournament Prince of Wales Cup (Show Jumping)	LCpl Bambling
1978	Army Junior Squash Rackets Champion	Spr Prentice
1979	Services Rifle Champion	SSgt Baldwin
	Army Angling Champion	J Hall
	Army Target Rifle Champion	R A Ellis
1980	Services Pistol Champion	S Lane-Jones

TABLE 11 MEMBERS OF THE ROYAL ENGINEERS REPRESENTING NATIONAL AND ARMY SPORTS

a. Representing Great Britain in Olympic Games

1964	S Jardine	Sailing
	A Jardine	Sailing
1968	S Jardine	Sailing
	A Jardine	Sailing
1972	S Jardine	Sailing
1976	A J Williams	Canoeing
	G Ferguson	Skiing
	E Martin	Water Polo
1980	A J Williams	Canoeing
	G Ferguson	Skiing
	J Wood	Skiing

b. National Representation

1960	G W Payne	Wales	Rugby
1962	S Jardine	Great Britain	Sailing
1967	W D J Gibson	England	Cross Country
1968	M Moncur	Great Britain	Sailing
1972-5	C A Haskey	Great Britain	Canoeing
1972	G D G Mitchell	Great Britain	Canoeing
1972-5	A J Williams	Great Britain	Canoeing
1972	K J Collins	Great Britain	Canoeing
1972	C Norton	Great Britain	Canoeing
1973	S M R Eagan	England (U23)	Hockey
1975	J F Henry	England	Cross Country
1978	A J Williams	Great Britain	Canoeing

c. Army Representation

Athletics
J R Donovan
W D J Gibson
T A Jameson
F J Kinchin
R Mawer
A G Milne
J C M Pickford
J Reynolds
M J B Richardson
G M Skippage
D R Summers

Badminton
W F Kirk
G Pollard
P St J Ruth

Boxing
Boomer
Ray
W Sutherley

Canoeing
I Cobley
K Cocks
K J Collins
S Grayson
L Hartless
C A Haskey
J H Hayden
A E T Mawer
G D G Mitchell
C Norton
A Orme
E Waterton
A J Williams
R C J Woollven

Cricket
B W P Bennett
R M G Brooks
R A Hall
P G Hatch
V E Nurse
R L Peck
M J B Richardson
W N J Withall

Cross Country
J Broad
J F Henry
J C Pickford

Cycling
A J Bunting

Fencing
A M Bell
T R M Pulverman
C Waterfall

Football
G D Ashbridge
B Ashley
A R Bicknell
C Bradbury
P Caples
K Cheetham
G Cross
M Doig
E Green
P Hurst
M Johnson
C Marchant
K M Seed
D Steadman

Football (contd)
D Thompson
G Torrence
D Tough
S J Tusz
D Wallace

Hockey
G Armstrong
C S Artis
A D Balgarnie
R M G Brooks
G Carty
S Chetwood
B E Collins
S C Court
A J Dent
M D Downey
S M R Eagan
J D Everett
N H W Fenn
B F Gerhard
M W Gilson
G B Grossmith
R J Henry
A F J Hobbes
C C N Jarrett-Kerr
P C Marsh
J D Rigby
R J Sandy
A I M Scopes
G I T Smith
P J Smith
A J Stamp
M W Stott
M T Whitworth
J Williamson
C R Wood

Judo
H A Daines
M Williams

Orienteering
P M Armstrong
G Dale
N O Fresson
C J Hurran
T Lillicrap

Rugby
G Ash
J S Ashcroft
K P Bassom
M Blomquist
W E Bott
R Braybrook
R D H Bryce
G B L Campbell
D W J Crawford
R W Dixon
B Dunn
S N L Fogden
N J Gray
M R Hanfield-Jones
M H S Heath
A J Hoon
R J N Leonard
M F N Mans
L Martin
R J Matthews
H Maxwell
G W Payne
M Quarikau
N C G Raffle
D Saunders
C Sexton
R M Stancombe

Rugby (contd)
D C Stevens
H G R Taggart
J G Vaux
D Wilson
J Wilson
D Wood
C Zimmerman

Sailing
G K Booth
A J Bradford
M H H Brooke
G Burrell
P F W Clarke
J A Cooper
T C Corfield
C L Elliott
A J Esslemont
R Furse
T Gibson
R G H Gravells
J B S Hamilton
B M Harris
C W Haskell
N G Hawkins
R B Hill
G Hyde
D R ff Innes
A Jardine
S Jardine
T R Kirkpatrick
R Lean-Vercoe
G Lucas
K C Mackay
R Mawer
D Mecher
M O'Boyle
P Pawley

Sailing (contd)
G C Philp
S Pyatt
J Rayner
E J Reid
J Reynolds
P G R Robinson
J W G Rogers
S Rogers
W Scullion
M T C Shaw
T Sinkinson
G E Smith
P Smith
C W Storr
E D C Tew
A S Tomlin
M R Walker
A G Whitfield
A E Williams

Shooting
E H Barker
G R Blythe
R Bolton
N Bull
A W A Burbridge
P L Dell
A F M Douglas
R A Ellis
J R Hill
K A Hook
D R Jones
S Lane-Jones
R G Merritt
J D Midwinter
J Palmer
B Taylor
B J Warwick
C T P Williams

Skiing
P W Clarke
N Coe
G F G Cowie
G Ferguson
I W Moir
D Reynolds
R V Vincent
M A Watkins
J Wood

Squash
H E Vialou-Clark

Tennis
T L Freeman
R J Henry
D Jeffery
M R Rich

Swimming and Water-Polo
M Ballard
D Bellamey
R Britton
R J H Cooke
G S Cox
R Crowe
R A Dows
J J Evendon
M Gibson
A Goodall
S Goodall
P Hahnefield
A Harvey
A Haslam
E B Hind
B Kaye
E Martin
P Mason
E Mogg
A E Montgomery
J Riley
A Sippe
W J Soper
J Speight
M Stafford
J L Taylor
D Ward

TABLE 12 SAILING

Details of REYC Yachts

Name	Bought	Cost	Remarks
Right Royal	1951	£4,600	Sold in 1962
Annasona	1955	£3,000	Sold in 1972
Leonis	1961	£1,350	Sold in 1964
Skerry	1961	£3,150	Sold in 1968
Ilex II	1963	£3,000	Sold in 1967
Ravelin	1969	£17,500	Sold in 1975
Contessa Catherine	1972	£7,300	
Robberee	1976	£8,000	Sold in 1978
Right Royal of Upnor	1977	£17,450	
Petrel	1978	£8,250	

REYC Yacht Entries in the Fastnet Race*

1961	Right Royal	E F Parker
	Annasona	J R M Hill
1963	Annasona	C W Woods
	Ilex II	E F Parker
1965	Ilex II	J B Hackford
1967	Annasona	D L Mackay
	Ilex II	J C Woollett
1969	Ravelin	J B S Hamilton
1971	Ravelin	A N Carlier
1973	Ravelin	D A Barker-Wyatt
1975	Ravelin	B Beverley
1977	Contessa Catherine	R W Dowdall
1979	Contessa Catherine	R W Dowdall
	Right Royal of Upnor	J R M Hill

**Footnote*

The REYC entered in the first Fastnet Race in 1925 and have had one or more entries in every subsequent Fastnet, one of the very few (if not the only) yacht clubs to have done so.

ANNEX A

ROLL OF HONOUR

Royal Engineers who died while on Active Service[1] 1960-1980

Rank	Initials	Name	Theatre	Date
Spr	D A	Adams	Aden	29 Aug 65
Spr	T F	Allchin	Aden	4 Jun 67
Spr	D J	Amos	NI[2]	28 Dec 71
Cpl	J	Andrew	NI	4 Sep 78
Spr	D	Asquith	Aden	12 Jul 64
Spr	M	Baldam	Aden	20 Jan 66
SSgt	M	Banks	NI	26 Jun 72
SSgt	L	Bourne	Aden	5 Oct 64
Spr (SAS)	R	Commins	Aden	27 Jan 66
Spr	J	Connachan	NI	27 Jun 71
WO2	I	Donald	NI	24 May 73
Spr	H B	Edwards	NI	11 Dec 76
Sgt	D	Evans	NI	21 Jul 76
Lieut	M R	Hanfield-Jones	Aden	1 Jun 64
Cpl	J A	Haynes	NI	28 Jul 77
Spr	R	Hurst	NI	17 May 72
Spr	G F F	Iles	Aden	5 May 67
LCpl	J W	Ince	Aden	30 May 67
Maj	R	Jarman	NI	20 Jul 73
Cpl	D G	Jones	Dhofar	4 Jun 75
Spr	M J A	Larkin	NI	9 Feb 77
WO2 (TA)	J F	Lonergan	Aden	12 Apr 65
Spr	G G	Lowe	Aden	4 Sep 63
SSgt	J W	Lund	NI	19 Jan 74
Sgt	R S	McCarter	NI	17 Jul 75
Spr	W	McDougall	Muscat	21 Feb 61
Maj	K	Milner	Borneo	20 Jan 65
WO1	J W	Newton	NI	24 Jun 75
LCpl	R	Nicoll	NI	15 May 74
Spr	M R E	Orton	NI	17 Sep 73
Cpl	D W	Price	Aden	30 May 67
LCpl	R	Smith	Aden	14 May 65
Spr	H T	Spalding	Aden	4 Sep 63
Spr	T E D	Stuart	NI	2 Oct 72

Rank	Initials	Name	Theatre	Date
Spr	D A	Thompson	NI	13 Jan 77
Spr	J	Vance	NI	14 Nov 77
Spr	J	Walton	NI	2 Jul 74
Spr	J N	Warburton	Aden	30 Apr 64
Spr	R G	Webber	Aden	9 Jan 65
Spr	A C	Williams	Malaya	13 Jul 60
Spr	SL	Worth	NI	1 Aug 77
Maj	P S	Wright	Dhofar	6 Jan 73

Notes

1 ie. during service for which a General Service Medal was awarded. Suicides are not included.

2 NI denotes Northern Ireland.

ANNEX B

CAMPAIGN DECORATIONS AND HONOURS AWARDED TO ROYAL ENGINEERS 1960-1980

Malaya (1960)

CBE

Brigadier J T S Tutton OBE, ADC
Colonel J W Bossard MBE

MBE

Major D F Densham-Booth
Captain J E Carvell

Borneo (1962-1966)

OBE

Colonel A E Arnold MBE

MBE

Major R D P Brown
Major G G Carter
Major P G L Mitchley

South Arabia (1964-1967)

MBE

Major M W Jenkins
Captain (QM) F C Taylor
Warrant Officer I G Ramsey

MM

Sergeant I R Scott

MC

Lieutenant M J Conroy

BEM

Staff Sergeant R B Christison

Oman (1970-1977)

MBE

Major R W M Eagle

BEM

Sergeant E A Lowe

MM

Warrant Officer 2 M J Barry
Sergeant R D Chappell
Lance Corporal I McLaren

Northern Ireland (1969-1980)

CBE

Major General M E Tickell MBE, MC
Brigadier C P Campbell
Brigadier H E M L Garrett
Colonel D A Barker-Wyatt MBE

MM

Corporal J Hamilton
Lance Corporal R Wilson
Sapper A G Young

OBE

Lieut Colonel D H Bowen MBE
Lieut Colonel J F M Grear
Lieut Colonel J R M Hill MBE
Lieut Colonel P M Hill
Lieut Colonel A Mornement

BEM

Warrant Officer 2 J S Clark
Staff Sergeant J V Fazackerley
Staff Sergeant K Reader
Staff Sergeant T W Wood
Sergeant D Cunliffe
Corporal H Ingram
Lance Corporal S P Pratt

MBE

Major J C G Cragg
Major J J J Thompson
Captain R H Whittington
Warrant Officer 2 W D Edmonds

QGM

Corporal P G B Ellis
Corporal A J Williams
Lance Corporal M R Beeson

Bomb Disposal (1960-1980)

GM

Major G R Fletcher MBE
Major A B Hartley MBE
Major H P Qualtrough MBE
Major M J V Hoskins
Warrant Officer 2 S D Hambrook
Sergeant H Cooke BEM

BEM

Staff Sergeant R G Collins (TA)
Staff Sergeant J C V Wood
Sergeant H Cooke
Sergeant G Duncan
Sergeant I R Hillier

OBE

Lieut Colonel B S T Archer GC ERD (AER)

QGM

Major A S Hogben

MBE

Major R I Radford
Captain T I Moore
Captain (QM) J A Shuter
Captain A R Warr

ANNEX B

Other Awards for Gallantry

MBE
Lieutenant C L Elliott

BEM
Staff Sergeant L Carney
Sergeant L J Linton
Sergeant Saroj Tamang (Gurkha Engineers)
Lance Corporal J Cavie
Lance Corporal M C Sindall
Sapper Tike Bahadur Sahi (Gurkha Engineers)
Sapper G A C Pedley
Sapper A R Prowse

Malaysian Awards

AMN (Ahli Mangku Negara)
Major E L V Wall

PBS (Pegawai Bintang Sarawak)
Major G G Carter

Omani Awards

WSh (Sultan's Gallantry Medal)
Major P S Wright

WB (Sultan's Bravery Medal)
Major P S Wright

WKhM (G) (Sultan's Distinguished Service Medal (Gallantry))
Major R D J Reid
Captain E W Wells
Sergeant J A Gillan

Citation

Major Paul Wright was the Commander of Number 1 Company, The Jebel Regiment on 6th February 1973 on operations in West Dhofar.

Having sited a firm base from which he could mount vigorous and aggressive operations against enemy positions of unknown strength he personally led a fighting patrol southwards to overlook the enemy main base on the coastal plain. Shortly after 0700 hours a man of a similar patrol working in support of Major Wright, stepped on a mine, the explosion of which compromised the presence of both parties.

The enemy reaction was sudden and violent and for some time the safety of both patrols was in doubt. Major Wright immediately ordered his party to fight its way back to the patrol base in the face of very heavy enemy fire. Immediately he arrived there he organized the evacuation of the casualty under the cover of jet strikes and mortar fire and covered the withdrawal of the other patrol which had by this time received further casualties.

Major Wright's conduct during the next six hours of fierce fighting equalled the most notable acts of gallantry in the history of The Sultan's Armed Forces. Sitting in the open under exceptionally heavy fire to control mortars and aircraft; moving from sangar to sangar to encourage his men; treating and recovering casualties and collecting ammunition; he was a cool, brave and selfless example to all. His military skill, determination, and aggressive leadership are beyond praise, and the way in which his soldiers responded to his orders in a dangerous situation is a measure of the respect they had for him. Brave officers who were present with Major Wright report that his example gave them confidence to see the task through, and that his conduct throughout the action was an inspiration.

At 1543 hours Major Wright was tragically killed by a direct hit from an enemy mortar. However by this time he had rallied and regrouped his men, and stabilized the position from which they were ultimately able safely to withdraw. There is no doubt that his brave conduct, military skill and resolute action inflicted a large number of casualties on the enemy and saved the lives of many men under his command.

Through a long hard day of continuous fighting Major Wright showed outstanding qualities of gallantry. His coolness in adversity, his professionalism and his complete and utter disregard for his own life were in the highest traditions of The Sultan's Armed Forces.

(SAFO 93 of 10 May 73)

ANNEX C

REGISTER OF FREEDOMS AND ADOPTIONS GRANTED TO THE CORPS AND UNITS DURING THE YEARS 1960 - 1980 INCLUSIVE

Location	Recipient	Year	Unit
Airdrie	Unit	1975	124 Fd Sqn (V)
Aldershot Borough	Corps	1965	HQ Trg Bde
Bethnal Green	Unit	1961	114 Corps Engr Regt (TA)
Birkenhead	Unit	1960	113 Army Engr Regt (TA)
Bradford	Unit	1969	272 Fd Sp Sqn (V)
Chatham Borough	Corps	1962	12 RSME Regt
Chelsea	Unit	1960	101 Engr Regt (TA)
Christchurch Borough	Unit	1969	MEXE
Epsom & Ewell	Unit	1962	135 Svy Engr Regt (TA)
Gibraltar	Corps	1972	1 (Fortress) STRE
Hameln Stadt	Corps	1977	28 Amph Engr Regt
Maidstone Borough	Corps	1965	36 Engr Regt
Medway Borough[1]	Corps	1977	HQ RSME
Nienburg Stadt	Corps	1980	21 Engr Regt
Rochester City[1]	Unit	1961	590 BD Sqn (AER)
St Helens Borough	Unit	1966	107 Fd Sqn (V)
Stafford Borough	Unit	1965	125 Corps Engr Regt (TA)
Strood RDC[1]	Corps	1968	12 RSME Regt
Swansea	Unit	1978	R Mon RE(M)
Tiergarten (Berlin)	Corps	1979	38 (Berlin) Fd Sqn
Wallasey Borough	Unit	1960	624 Crane Op Sqn (AER)
Wallsend	Unit	1960	506 Fd Sqn (TA)
Wallsend	Unit	1970	103 Fd Sqn (V)
Willich Stadt	Corps	1973	40 Army Sp Regt

Notes

[1] In these cases the towns *adopted* the units shown. It should be noted that the *freedom* of the city of Rochester had already been granted earlier to the Corps as a whole, prior to 1960.

ANNEX D

SENIOR APPOINTMENTS FILLED BY OFFICERS OF THE CORPS OF ROYAL ENGINEERS 1960 - 1980

CHIEF ROYAL ENGINEERS

1958 General Sir Kenneth Crawford KCB MC
1961 General Sir Frank Simpson GBE KCB DSO
1967 General Sir Charles Jones GCB CBE MC
1972 General Sir Charles Richardson GCB CBE DSO
1977 Lieut General Sir David Willison KCB OBE MC

INTERNATIONAL AND GOVERNMENT APPOINTMENTS

1960 Chairman British Transport Commission
General Sir Brian Robertson Bt GCB GBE KCMG KCVO DSO MC
1962 Director of Works Commonwealth War Graves Commission Major General J F D Steedman CBE MC
1971 Defence and Military Adviser to British High Commissioner India
Major General L Scott-Bowden CBE DSO MC*
1973 Chief of the Joint Services Liaison Office (BAOR)
Major General O Mc C Roome CBE
1973 Director International Military Staff NATO
Lieut General Sir John Read KCB OBE

MAJOR COMMAND APPOINTMENTS

1960 GOC Singapore Base District
Major General C L Richardson CB CBE DSO
1960 GOC 1 (BR) Corps
Lieut General Sir Charles Jones KCB CBE MC
1962 GOC-in-C Northern Command
Lieut General Sir Charles Jones KCB CBE MC
1963 GOC-in-C Northern Command
Lieut General Sir Charles Richardson KCB CBE DSO
1963 GOC 42 (Lancs & Cheshire) Div TA/NW District
Major General J N Thomas DSO MC
1970 GOC-in-C Northern Command
Lieut General W G F Jackson OBE MC*
1971 GOC South West District
Major General H P Cunningham OBE
1973 GOC West Midland District
Major General R W T Britten MC

1974 GOC South West District
Major General G L C Cooper MC
1976 Deputy C-in-C UKLF
Lieut General Sir Hugh Beach KCB OBE MC
1979 GOC South East District
Lieut General Sir George Cooper KCB MC

MINISTRY OF DEFENCE AND OTHER STAFF APPOINTMENTS

1960 VCIGS
Lieut General Sir William Stratton KCB CVO CBE DSO
1960 DPS
Major General G W Duke CBE DSO
1960 DCD
Major General C L Richardson CB CBE DSO
1960 COS HQ NORTHAG
Major General R W Ewbank CB CBE DSO
1960 COS to Chairman BDS Washington
Major General D W Price CB CBE
1960 COS HQ Northern Command
Major General J K Shepheard CB OBE DSO
1960 CBAS Washington
Major General C L Richardson CB CBE DSO
1961 DMGS OS
Major General L F de V Carey CB CBE
1961 DGMT
Lieut General C L Richardson CB CBE DSO
1964 ACOS (Int) SHAPE
Major General J M L Gavin CBE
1964 DQMG
Major General I H Lyall Grant MC
1964 COS HQ Southern Command
Major General M W Prynne CBE
1965 SDO (Army Rep)
Major General M W Prynne CBE
1965 DCD
Major General J N Thomas DSO MC
1966 MDHDS
Major General E M Hall MBE
1966 DPS (Ex UNISON)
Major General W G F Jackson OBE MC*

1966 DGMS OS
Major General RCA Edge MBE
1967 DM(A)
Major General C W Woods MBE MC
1968 DMO
Major General J H S Read OBE
1968 DAEP
Major General W G F Jackson OBE MC*
1968 DCDS (OR)
Lieut General J N Thomas CB DSO MC
1970 ACDS (Policy)
Major General J H S Read OBE
1970 DACGS (OR)
Major General W G F Jackson OBE MC*
1970 COS to C-in-C AFNORTH
Major General A E Younger DSO OBE
1971 DASD
Major General W G H Beach OBE MC
1972 DCDS (Int)
Lieut General D J Willison OBE MC
1972 ACDS (OR)
Major General F G Caldwell OBE MC*
1972 DQMG
Major General R W T Britten MC
1972 DMAO
Major General W F Cooper CBE MC
1972 ACOS (Int) SHAPE
Major General J M H Lewis CBE
1971 Director Int Mil Staff NATO
Lieut General Sir John Read KCB OBE
1973 VPOB
Major General P J M Pellereau MBE
1974 DPS(A)
Major General J H Page OBE MC
1974 ACGS (OR)
Major General H P Cunningham OBE
1974 DVT & C
Major General P C Shapland MBE
1975 Major General I C Admin HQ UKLF
Major General H E M L Garrett CBE

1975 President RCB
Major General AGC Jones MC
1976 DCDS (OR)
Lieut General Sir Hugh Cunningham KBE
1976 DASD
Major General G L C Cooper MC
1976 VAG
Major General H E M L Garrett CBE
1977 DVT & C
Major General J H Foster
1977 DMAO
Major General F W E Fursdon MBE
1979 ACOS (Int) SHAPE
Major General C J Popham CB
1980 DPS(A)
Major General M Matthews CB
1980 DAAC
Major General W N J Withall CB

Directors of Movements
1961 Major General S H M Battye CB

Directors of Military/Service Intelligence
1960 Major General R E Lloyd CB CBE DSO
1971 Major General D J Willison OBE MC

Masters General of the Ordnance
1960 Lieut General Sir John Cowley GC KBE CB
1963 Lieut General Sir Charles Jones KCB CbE MC
1966 General Sir Charles Richardson KCB CBE DSO
1971 General Sir Noel Thomas KCB DSO MC
1977 General Sir Hugh Beach KCB OBE MC

Quartermasters General
1960 General Sir Cecil Sugden GBE KCB ADC (Gen)
1965 General Sir Charles Richardson KCB CBE DSO
1973 General Sir William Jackson KCB OBE MC*

Deputy Quartermasters General
1967 Major General I H Lyall Grant MC
1970 Major General F W J Cowtan CBE MC*
1971 Major General RWT Britten CB MC
1973 Major General W F Cooper CBE MC

Governors Royal Hospital Chelsea
1961 General Sir Frank Simpson GBE KCB DSO
1969 General Sir Charles Jones GCB CBE MC

ALL ARMS TRAINING ESTABLISHMENTS
1961 Comdt Royal Military College of Science
Major General R W Ewbank CB CBE DSO
1971 Chief Army Instr Royal College of Defence Studies
Major General R L Clutterbuck OBE
1971 Comdt Royal Military College of Science
Major General F W J Cowtan CBE MC*
1972 Chief Army Instr Royal College of Defence Studies
Major General A E Younger OBE DSO
1974 Comdt Staff College Camberley
Major General W G H Beach OBE MC
1975 Comdt Royal Military College of Science
Major General M E Tickell CBE MC

PRINCIPAL ROYAL ENGINEER APPOINTMENTS
Engineers-in-Chief
1960 Major General T H F Foulkes CB OBE
1963 Major General G W Duke CB CBE DSO
1965 Major General J H S Bowring CB OBE MC
1968 Major General R L Clutterbuck CB OBE
1970 Major General F G Caldwell OBE MC*
1972 Major General M E Tickell CBE MC
1975 Major General J H Foster
1977 Major General C P Campbell CBE
1980 Major General G B Sinclair CB CBE

Deputy Engineers-in-Chief
(Designated Brigadiers General Staff until 1965)
1960 Brigadier A P Lavies CBE ADC
1964 Brigadier A G Peart OBE
1966 Brigadier J C Woollett CBE MC

1967 Brigadier M L Crosthwait MBE
1970 Brigadier M G Stevens MBE
1973 Brigadier B C Elgood MBE
1975 Brigadier C A Landale ADC
1978 Brigadier R W M Lister ADC
1979 Brigadier R A Blomfield ADC

Directors General Ordnance Survey
1960 Major General L F de V Carey CB CBE
1961 Major General A H Dowson CBE
1965 Major General R C A Edge CB MBE
1969 Major General B St G Irwin CB

Directors Mil Survey
1960 Brigadier A H Dowson OBE ADC
1962 Brigadier L J Harris CBE
1966 Brigadier B St G Irwin
1970 Brigadier A Walmesley-White
1972 Brigadier J Kelsey CBE
1974 Major General J Kelsey CBE
1977 Major General F M Sexton CB OBE
1980 Major General E W Barton CB MBE

Brigadiers Survey
1974 Brigadier F M Sexton OBE
1977 Brigadier E W Barton MBE
1978 Brigadier R M W Busk OBE

Brigadiers Engineer (Q Services)
(designated Brigadiers Engineer Plans in 1964 and Directors Engineer Services in 1972)
1960 Brigadier J B Brown
1960 Brigadier R B Muir CBE
1961 Brigadier A J le G Jacob MBE
1964 Brigadier D C Cameron CBE ADC
1967 Brigadier R A Lindsell MC
1968 Brigadier C H Cowan
1970 Brigadier J R E Hamilton-Baillie MC ADC
1974 Brigadier D L G Begbie OBE MC
1976 Brigadier R Wheatley OBE
1979 Brigadier N R Sturt

Commanders Engineer Stores Establishment/ Engineer Support Group
1960 Brigadier W H D Wakely
1964 Brigadier A J Le G Jacob MBE
1966 Brigadier J Constant
1968 Brigadier R H Walker ADC
1969 Brigadier A E Arnold OBE
1972 Brigadier J D Walker OBE
1974 Brigadier R W M Lister
1976 Brigadier J A Notley MBE
1978 Brigadier D J N Genet
1980 Brigadier D H Bowen OBE

Commanders Transportation Centre
1960 Brigadier A G P Leahy OBE
1961 Brigadier F H Lowman DSO MBE
1964 Brigadier J C Woollett CBE MC

Deputy Directors MEXE/MVEE (Christchurch)
1960 Brigadier H A T Jarrett-Kerr OBE
1965 Brigadier J R Blomfield OBE MC
1968 Brigadier R A Lindsell MC

Directors Army Postal Service/Postal & Courier Communications
1960 Brigadier J N Drew CBE
1970 Brigadier A A Seaton MBE
1974 Brigadier L P Bennett CBE
1977 Brigadier J W Bridge
1980 Brigadier D J London OBE

Commandants SME/RSME
1960 Brigadier E F Parker OBE
1962 Brigadier J G Carr
1965 Brigadier I H Lyall Grant MC
1967 Brigadier W M Inglis CBE
1970 Brigadier S E M Goodall OBE MC
1973 Brigadier J I Purser OBE
1975 Brigadier G B Sinclair CBE
1977 Brigadier C J Rougier
1979 Brigadier A C D Lloyd

Officers IC RE Manning & Records Office
1960 Colonel T Burrowes OBE
1962 Colonel R O H Carver OBE
1966 Colonel B G Bloomer OBE
1967 Colonel G R M H More MC*
1970 Colonel D L G Begbie OBE MC
1973 Colonel B R Lamble
1976 Colonel D J N Genet
1978 Colonel G W A Napier

Assistant Adjutants General AG7
1960 Colonel A P Lavies OBE
1962 Colonel A G Peart OBE
1964 Colonel R L Clutterbuck OBE
1965 Colonel G R M H More MC*
1967 Colonel M G Stevens MBE
1970 Colonel H R D Hart
1973 Colonel A N Brearley-Smith OBE
1976 Colonel A J V Kendall
1978 Colonel K J Marchant

Directors Royal Engineer Equipment
(War Office)
1959 Brigadier J T S Tutton CBE ADC
1961 Brigadier J R G Finch OBE
1964 Brigadier R A Lindsell MC

Assistant Directors Royal Engineer Equipment
(Development)
(Ministry of Defence)
1964 Colonel T H Egan MBE
1966 Colonel B G Rawlins
1967 Colonel P J M Pellereau MBE
1970 Colonel R Bellingham-Smith MBE

Project Managers General Engineer Equipment
(Procurement Executive)
1972 Colonel R Bellingham-Smith MBE
1972 Colonel P M Castle-Smith MC

1974 Colonel R W Bird
1977 Colonel H W B Mackintosh
1979 Colonel P M Blagden CBE

CHIEF ENGINEERS, HOME COMMANDS

Eastern Command
1960 Brigadier A H G Dobson OBE MC
1962 Brigadier J M L Gavin OBE
1964 Brigadier R W C Smales
1967 Brigadier E F Kyte CBE

Southern Command
1960 Brigadier D W Reid MBE ADC
1963 Brigadier E L H Smith MBE MC
1966 Brigadier K H Stevens MBE
1968 Colonel J R de G Pilkington OBE MC
1971 Colonel C A A Crouch OBE

Army Strategic Command
1968 Brigadier A E Younger OBE DSO
1970 Brigadier E M Mackay MBE

United Kingdom Land Forces
1972 Brigadier E M Mackay MBE
1973 Brigadier R M Merrell MBE
1975 Brigadier H W L Browne OBE
1978 Brigadier R A S Rickets

Western Command
1960 Brigadier W H Aylwin
1962 Brigadier K F Daniell OBE
1964 Brigadier R L France CBE MC
1966 Brigadier J D Sturrock OBE
1967 Brigadier R W T Britten MC
1969 Brigadier P C Shapland MBE
1971 Brigadier B C Elgood MBE

Northern Command
1960 Brigadier J G Carr
1962 Brigadier T H Evill DSO

1964 Brigadier W M Inglis
1967 Brigadier R A Barron
1968 Brigadier J I Purser OBE
1970 Brigadier G T E Westbrook OBE

Scottish Command/Scotland
1960 Brigadier H R Greenwood
1962 Colonel D C Cameron CBE
1964 Colonel L Mc L Young MBE MC
1966 Colonel J E Weller MC
1969 Colonel R G Bishop
1971 Colonel L G S Thomas OBE
1972 Colonel D M Panton MBE
1973 Colonel H W H Webb-Bowen OBE

ENGINEER BRIGADE/GROUP COMMANDERS IN UNITED KINGDOM

12 Engineer Brigade/Group
1960 Colonel K H Stevens MBE
1963 Colonel I D S Brown MC
1965 Brigadier D R Carroll OBE
1967 Brigadier M E Tickell MBE MC
1969 Brigadier H E M L Garrett
1971 Brigadier C P Campbell
1973 Brigadier C J Popham
1975 Brigadier A C S Ross

29 Engineer Brigade/Group(V)
1966 Brigadier H G W Hamilton CBE
1968 Brigadier J I Purser OBE
1970 Brigadier G T E Westbrook OBE
1972 Brigadier C A Landale
1974 Brigadier D A Barker-Wyatt CBE
1976 Brigadier S T Baldry MBE
1979 Brigadier F G Barton

30 Engineer Brigade/Group(V)
1967 Brigadier R W T Britten MC
1968 Brigadier P C Shapland MBE

1971 Brigadier B C Elgood MBE
1973 Brigadier P W A Holdsworth
1975 Brigadier H J Goodson OBE
1978 Brigadier H F Everard
1980 Brigadier E G Willmott

Training Brigade/11 Engineer Brigade/Group
1960 Brigadier H W Kitson CBE
1962 Brigadier E M Hall
1964 Brigadier J H S Read OBE
1966 Brigadier L Scott-Bowden DSO OBE MC*
1969 Brigadier A G C Jones MC
1972 Brigadier P F Aylwin-Foster
1974 Brigadier W N J Withall
1976 Brigadier R W Dowdall
1979 Brigadier C W Beckett

UNITED KINGDOM
Commanders Royal Engineers 3 Division
1960 Lieut Colonel W F Cooper MC
1963 Lieut Colonel H P Cunningham
1966 Lieut Colonel C A Landale
1969 Lieut Colonel C B Pollard
1971 Colonel C P Campbell
1971 Colonel A M Pyne
1974 Colonel H F Everard
1976 Colonel J R M Hill OBE

Commanders Royal Engineers Scotland
1975 Lieut Colonel R F H Cole
1978 Lieut Colonel J L Barker
1980 Lieut Colonel D A MacLean

BRITISH ARMY OF THE RHINE
Chief Engineers Northern Army Group/BAOR
1959 Major General I H F Boyd CBE
1962 Major General J K Shepheard CB CBE DSO
1964 Major General A H G Dobson OBE MC
1967 Major General J C Woollett CBE MC

1970 Major General D R Carroll OBE
1973 Major General E M Mackay CBE
1976 Major General C B Pollard
1979 Major General J P Groom CBE

Commanders Corps Royal Engineers 1 (British) Corps
1960 Brigadier T H Evill DSO
1962 Brigadier R H Walker
1965 Brigadier J R Cave-Browne MC
1966 Brigadier F G Caldwell OBE MC
1968 Brigadier J H Page OBE MC
1970 Brigadier J H Foster
1972 Brigadier C B Pollard
1974 Brigadier M Matthews
1976 Brigadier J P Groom CBE
1979 Brigadier D H A Swinburn
1980 Brigadier F G Bevan

Commanders Royal Engineers 1 Division
1960 Lieut Colonel L Scott-Bowden DSO MC
1962 Lieut Colonel J I Purser
1965 Lieut Colonel C P de B Jenkins MBE MC
1967 Lieut Colonel C P Campbell
1969 Colonel P W A Holdsworth
1971 Colonel W J Reed
1973 Colonel R A Blomfield
1975 Colonel J H Hooper OBE
1978 Colonel R A Pinder

Commanders Royal Engineers 2 Division
1960 Lieut Colonel D Ross OBE
1961 Lieut Colonel F G Caldwell OBE MC
1963 Lieut Colonel S E M Goodall MBE MC
1965 Lieut Colonel W G H Beach MBE MC
1967 Lieut Colonel E N Ross-Magenty MBE
1968 Lieut Colonel B S Read
1969 Colonel J D Walker OBE
1971 Colonel M G L Roberts MBE
1974 Colonel A G Steel
1977 Colonel R Jukes-Hughes MBE
1979 Colonel J H Edwards

Commanders Royal Engineers 3 Division
1977 Colonel J R M Hill OBE
1979 Colonel F G Bevan
1980 Colonel N M White

Commanders Royal Engineers 4 Division
1960 Lieut Colonel A J I Poynder MC
1962 Lieut Colonel D R Carroll OBE
1964 Lieut Colonel M E Tickell MBE MC
1966 Lieut Colonel G L C Cooper MC
1968 Lieut Colonel J P Groom MBE
1969 Colonel E C O'Callaghan MBE MC
1971 Colonel C J Popham
1973 Colonel R W Dowdall
1975 Colonel D H Bowen OBE
1978 Colonel J S Symons
1980 Colonel J E Kitching

Commanders 11 Engineer Group/Brigade
1960 Colonel R H Walker
1962 Colonel M L Crosthwait MBE
1964 Brigadier M L Crosthwait MBE
1966 Brigadier F W J Cowtan MBE MC
1968 Brigadier H P Cunningham OBE

FAR EAST LAND FORCES
Chief Engineers FARELF
1960 Brigadier R A G Binny OBE
1961 Brigadier J H S Bowring OBE MC
1964 Brigadier K H Stevens MBE
1966 Brigadier R L Clutterbuck OBE
1968 Brigadier W F Cooper OBE MC
1970 Colonel R F N Anderson OBE MC

Chief Engineers Federation/Malaysian Armed Forces
1959 Lieut Colonel R A Blakeway
1960 Lieut Colonel R F N Anderson
1963 Lieut Colonel E M Mackay
1966 Colonel J H Frankau MC

Commanders Engineer Base Group/Engineer Group, Singapore
1960 Colonel D C S David MC
1961 Colonel H F Boswell OBE
1964 Colonel P S Baines MBE
1966 Colonel D Kenwrick-Cox MBE

Commanders Royal Engineers
17 Division/Malaya District
1960 Lieut Colonel L G S Thomas OBE
1963 Lieut Colonel M J A Campbell MBE, MC
1965 Lieut Colonel T C White
1966 Lieut Colonel P F Aylwin-Foster
1968 Lieut Colonel G G Roach

Commanders Royal Engineers Hong Kong
1959 Lieut Colonel B D Mackenzie
1962 Lieut Colonel P H Thompson MC
1965 Lieut Colonel D R Eales
1968 Lieut Colonel J L Booth
1970 Lieut Colonel R A S Rickets
1973 Lieut Colonel J H Edwards
1975 Lieut Colonel J Speight
1978 Lieut Colonel M J F Stephens

Commanders Royal Engineers Crown
1964 Lieut Colonel H N McIntyre MC
1965 Lieut Colonel K N Orrell
1966 Lieut Colonel H W L Browne MBE

Commanders Queens Gurkha Engineers
1965 Lieut Colonel M J A Campbell MBE MC
1967 Lieut Colonel T C White
1968 Lieut Colonel G G Roach
1970 Lieut Colonel R A S Rickets
1973 Lieut Colonel J H Edwards
1975 Lieut Colonel J Speight
1978 Lieut Colonel M J F Stephens

Commanders Royal Engineers Borneo
1962 Major D J N Genet
1963 Major G N Ritchie
1963 Major A D Milne
1963 Lieut Colonel H W H Webb-Bowen
1964 Lieut Colonel J F Allen MBE
1965 Lieut Colonel A E Arnold OBE
1966 Lieut Colonel P F Aylwin-Foster

Commanders British Gurkhas (India/Nepal)
1959 Lieut Colonel J Thornber
1960 Lieut Colonel A J Wheatcroft

OTHER COMMANDS
Chief Engineers Middle East Land Forces
1960 Brigadier C E H Sparrow OBE MC
1961 Colonel J Constant
1964 Colonel P Drake-Wilkes OBE
1966 Colonel H W Baldwin OBE

Commanders Royal Engineers Middle East Command/Operations
1963 Lieut Colonel W D C Holmes MC
1965 Lieut Colonel P C Shapland
1967 Lieut Colonel W J Reed

Commanders Royal Engineers Deployment Camps/Works
1962 Lieut Colonel E E Peel
1964 Lieut Colonel D F Densham-Booth
1967 Lieut Colonel J A Robinson

Commanders Royal Engineers Gulf
1967 Lieut Colonel W J Reed
1969 Lieut Colonel H F Everard

Commanders Royal Engineers East Africa
1960 Lieut Colonel C E Otway OBE MC
1961 Lieut Colonel J R de G Pilkington MC

Commander Royal Engineers Gibraltar
1960 Lieut Colonel J M H Lewis OBE

Commanders Royal Engineers Malta & Libya
1963 Lieut Colonel M G Stevens MBE
1965 Lieut Colonel E J Moss
1967 Lieut Colonel T B V Marsh OBE

Commander Royal Engineers Christmas Island
1960 Lieut Colonel J P Asher MBE

Chief Engineer Near East Land Forces
1962 Colonel J Constant

Commanders Royal Engineers Cyprus District
1963 Lieut Colonel M J Andrews MBE
1965 Lieut Colonel E C O'Callaghan MBE MC
1967 Lieut Colonel E F Twiss

Commanders Royal Engineers Near East Land Forces
1968 Lieut Colonel E F Twiss
1969 Lieut Colonel G B Sinclair

Commanders Royal Engineers Northern Ireland
1970 Lieut Colonel J F M Grear
1972 Lieut Colonel J R Yerburgh
1974 Lieut Colonel R H Morris
1976 Lieut Colonel W M R Addison
1978 Lieut Colonel P M Hill
1980 Lieut Colonel R M Stancombe

ANNEX E

REGULAR ARMY ENGINEER UNITS 1960-1980

Special Abbreviations:

AES	Amph Engr Sqn	CER	Corps Engr Regt	Fo	Formed	RC	River Crossing
AF	Amalgamated to Form	CFPS	Corps Field Park Squadron	FPS	Field Park Squadron	TF	Transferred from
AR	Armd	CI	Christmas Island	FS	Field Squadron	TT	Transferred to
AW	Amalgamated With	CSS	Corps Support Squadron	FSS	Field Support Squadron	UC	Under Command
Be	Became	Di	Disbanded	Gu	Gurkha		

REGIMENTS

Note: In 1957/58 BAOR was reorganized onto a Bde Gp concept and Fd Sqns became an integral part of Bde Gps. Engr Regts were disbanded, and their HQs formed HQs RE of divs. A separate section on Div Engrs is at the end of this Annex. Regts were reformed in 1969.

UNIT TITLE	YEAR	LOCATION	SUB UNITS	REMARKS	COMMANDING OFFICERS	UNIT ORIGINS
(a)	*(b)*	*(c)*	*(d)*	*(e)*	*(f)*	*(g)*
Depot Regiment	1959	Chatham	HQ Sqn Depot Sqn	RE Depot AW 10 Trades Training Regiment. Be Depot Regt RE	Lt Cols: Sep 1959: J H Frankau Dec 1961: J Gordon Jan 1964: J A Coombs Jul 1966: P Norbury	
	1962		58 SME Sqn Fo Jan 59 Sqn AW 'B' Sqn Depot Regt, Be 59 SME Sqn 59 SME Sqn Be 36 RSME Sqn	July 1962, SME granted Royal Title, Sqns Be RSME Sqns	Feb 1969: A H Blanford Sep 1971: PC Harvey Mar 1974: D N Hall Sep 1976: J A McK Holloway Aug 1978: D H G Corsellis	

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1964		HQ Sqn Di	Regt moved to Kitchener Barracks while Brompton modernized.		
	1967			Regt returned to Brompton Barracks		
	1973		58 RSME Sqn Di			
Fortress Engineer Regiment	1960	Gibraltar	1 Fortress Sqn 32 Fortress Sqn	Early 1960 32 Fortress Sqn be a Const Sqn. Its tunnelling troop TT 1 Fortress Sqn.	1959 - Aug 1961 Lt Col J M H Lewis	Fo Gibraltar 1950
	1961		1 Fortress Sqn	Regiment Di 1 Fortress Sqn assumed Regimental role		
			32 Const Sqn TT 38 CER, Ripon			
HQ Bomb Disposal Unit (UK)	1960	Horsham	Tp Mundesley Tp Horsham BD School Horsham		Lt Cols 1959 J H Clark 1962 C A A Crouch 1964 A G Townsend-Rose	
	1966 1969 1973	Chattenden		Moved to Chattenden Redesignated EOD Reorganized as 33 Engr Regt (EOD)	1967 I T C Wilson 1969 F W B Carter 1971 R C Plummer	

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Junior Leaders Regiment	1958	Dover	A; B, C Sqns	Regt moved to Dover from Aldershot December	Lt Cols: Aug 1959: P D Stenning Dec 1961: H R D Hart Sep 1964: B C Elgood	Fo Apr 1958, Aldershot by expansion of Jnr Ldrs Sqn
	1975		A Sqn Be 54 Jnr Ldrs Sqn	54 (HK) Sp Sqn Di 1971	Dec 1966: J G T Polley Aug 1969: A A Julius	
	1978		B Sqn Be 66 Jnr Ldrs Sqn C Sqn Be 82 Jnr Ldrs Sqn	66 Plant Sqn Di 1978 82 (Indep) HK Sqn Di 1958	Dec 1971: G W Preston-Jones Mar 1974: D J R Cook May 1976: J N Blashford-Snell Sep 1978: F T Fisher	
1 Training Regiment	1960	Cove	27 Trg Sqn, 28 Trg Sqn C Trg Sqn Be 57 Trg Sqn	57 Sqn Di 1959	Lt Cols: Aug 1959: J H S Read Dec 1961: V H S Hannay	Moved to Cove from Malvern 1959
	1962		55 Trg Sqn TF 4 Trg Regt 56 (MT) Trg Sqn TF 4 Trg Regt	Regt Absorbed 4 Trg Regt 56 (MT) Trg Sqn located at Aldershot	Feb 1964: R W T Britten May 1965: R F N Anderson Jan 1968: M W Jenkins Mar 1970: A G Steel Sep 1972: P E Morrison Mar 1975: J K Chater	
			HQ Sqn Fo		Sep 1977: P M Blagden Oct 1979: S R Gilbert	
	1963		56 (MT) Trg Sqn moved to Crookham			
	1968		56 (MT) Trg Sqn and 57 Trg Sqn TT 3 Trg Regt	1 Trg Regt reorganized and 3 Trg Regt reformed		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1973		27 Trg Sqn Di. HQ Sqn Be 27 HQ Sqn			
	1977		55 Trg Sqn TT 3 Trg Regt 56 (MT) Trg Sqn TT 1 Trg Regt, remaining at Crookham	1 and 3 Trg Regts reorganized		
	1979		27 HQ Sqn Di. Replaced by HQ Troop			
	1979	Camberley		Regiment moved to purpose built Gibraltar Barracks at Camberley 56 (MT) Trg Sqn remained at Crookham		
	1980		27 HQ and Volunteer Trg Sqn formed from HQ Troop			
3 Training Regiment	1960	Cove	C Trg Sqn Di Nov A Trg Sqn Di Dec B Trg Sqn Di Dec		Lt Cols: Nov 1959: B A A Plummer Jan 1968: A M Pyne	3 Trg Regt formed at Cove 1947
	1961		HQ Sqn Di	Regt and HQ Sqn AW 4 Trg Regt	Jul 1970: P L Newth Jan 1973: J B Wilks	
	1968	Cove	HQ Sqn Fo 56 (MT) Trg Sqn TF 1 Trg Regt, remained at Crookham 57 Trg Sqn TF 1 Trg Regt	3 Trg Regt Reformed. Took over part of 1 Trg Regt's role	Aug 1975 A Mornement Sep 1977: J W Prosser Apr 1980: R J Christie	

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1972		HQ Sqn Be HQ Troop			
	1977		55 Trg Sqn TF 1 Trg Regt. 56 (MT) Trg Sqn TT 1 Trg Regt	1 and 3 Trg Regts reorganized		
	1979	Camberley		Moved to new, purpose built Gibraltar Barracks, Camberley		
	1980		63 Trg Sp Sqn Fo			
4 Training Regiment	1961	Aldershot	55 Trg Sqn 56 (MT) Trg Sqn	Regt absorbed role of 3 Trg Regt. No additional sqns formed	1959-1962 Lt Col R F Parker	4 Trg Regt Fo at Aldershot 1947
	1962		55 Trg Sqn TT 1 Trg Regt, June 56 (MT) Trg Sqn TT 1 Trg Regt, June	Regiment absorbed by 1 Trg Regt and Di Dec.	Lt Cols: Jan 1959: P S Baines 1961: A F Leslie 1963: R S Genn Apr 1966: P H Budden Nov 1968: H E H Newman Mar 1971: G H Barton Jul 1973: D G Hutchinson Feb 1976: J E Kitching Sep 1978: J P W Simpson 1980: M R Cooper	
12 RSME Regiment	1960	Brompton, Chatham	A Sqn Be 18 SME Sqn, Feb B Sqn (name unchanged) C Sqn Be 40 SME Sqn, Feb D Sqn Be 17 SME Sqn, Dec			Oct 1949 12 (SME) Regt Fo at Brompton from 1 (SME) Depot Bn.
	1961	Gillingham	B Sqn Di, Dec	Regt moved to Gordon Barracks, less 18 SME Sqn to Kingshill Barracks Hoo		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1962			SME granted 'Royal' title. Regt Be 12 RSME Regt, Sqns Be RSME Sqns		
	1965		18 Sqn and 40 Sqn AF 18/40 RSME Sqn, Nov.			
	1966	Chattenden		Regiment moved to Chattenden Aug		
	1969		18/40 RSME Sqn Be 18 RSME Sqn 40 RSME Sqn reformed, Nov			
	1973		40 RSME Sqn Di			
	1977		17 RSME Sqn Be Transportation Support Unit for Chatham, with RCT officer commanding			
			40 Plant Support Sqn formed, Aug			
16 Railway Training Regiment	1959	Longmoor	8 Rly Sqn under local command only 49 Rly Trg Sqn 53 Rly (Depot) Sqn		Lt Cols: Aug 1959: E R Paterson Feb 1961: D R Hildick-Smith 1963: A H Gye	Fo 1948 Longmoor

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1959		53 Rly (Depot) Sqn Be Rly (Depot) Sqn			
	1961		Rly (Depot) Sqn and 49 Rly Trg Sqn AF 49 Rly Depot Sqn			
	1964		49 Rly Depot Sqn Be 49 Rly Trg Sqn			
	1965			July. Role of regt transferred to RCT, regt and sqns Di		
17 Port Training Regiment	1960	Cyprus, Singapore and Marchwood	10 Port Op Sqn (Singapore) 51 Port Op Sqn (Cyprus) 52 IWT Op Sqn (Marchwood) 53 Port Maint Sqn (Marchwood)			Fo 1948 Marchwood
	1960		51 Port Op Sqn rejoined regt at Marchwood, less one Tp in Cyprus			
	1961		52 and 53 Sqns redesignated Port Sqns			
	1962		10 and 51 Sqns redesignated Port Sqns			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1964		10 Port Sqn Di		Lt Cols: 1960: R A P Wehner	
	1965		51, 52, 53 Port Sqns Di	Role transferred to RCT, regt Di	Mar 1962: M L Wood 1964: G J Athey	
21 Engineer Regiment	1969	Nienburg	1, 4 FS	Fo from 1 Fd Sqn and 4 Fd Sqn already at Nienburg	Lt Cols: Oct 1967: C P Campbell Mar 1970: A C S Ross	21 Engr Regt Di 1958 on BAOR reorganization
	1971			Apr- Jul to NI in Inf role	Sep 1972: C J Rougier	
	1974			Dec-Mar 1975 to NI in inf role	Nov 1974:T S Sneyd	
	1976			Sep-Dec to NI in inf role	Mar 1977: R L Peck Sep 1979: J A J P Barr	
	1977		7 FS TF 32 Engr Regt Sep			
	1978		45 FPS TF HQRE 1 Div Apr	Regt Be 1 Armd Div Engr Regt		
22 Engineer Regiment	1960	Chiseldon	3 FS 6 FPS 23 FS 23 FS Be indep but remained UC	Mar. Regt joined 3 Div. Be HQ RE 3 Div	Lt Cols: Mar 1959: J R Blomfield Dec 1960: W F Cooper Jun 1963: H P Cunningham Jan 1966: C A Landale	Fo Libya 1948
	1961	Tidworth		Regt moved to Tidworth	Jan 1969: C B Pollard May 1971: C R Grey	

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1962		May. 23 Indep FS Be a cadre, left regt for BAOR Be 23 Amph R C Sqn 68 Indep Gu FS, joined 3 Div Engrs from		Jan 1974: R A Pinder Jan 1976: J A M Evans May 1978: F G Sugden Oct 1980: H H Kerr	
	1963		Malaya. 68 Indep Gu FS TT Malaya			
	1964		May-Sep HQ RE 3 Div May-Oct 3 Indep FS Jul-Apr 65 6FPS	To Aden		
	1964		Oct 34 FS TT 3 Div Engr from Kenya			
	1965		3 Indep FS ceased to be indep			
	1967		Jul 8 FS Fo at Tidworth. UC 3 Div Engr			
	1968		Jan 6 FPS Be 6 FSS			
	1970			Sep 3 Div Engr redesignated 22 Engr Regt		
	1972			Aug - Sep RHQ to NI		
	1975	Perham Down		Regiment moved to Perham Down, Jan.		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1977		34 FS TT 39 Engr Regt 52 FS TF 39 Engr Regt Waterbeach as 52 FS (Const)			
23 Engineer Regiment	1969	Osnabrück	7 FS, 16 FS, 43 FSS	Fo from 7 FS (Ripon) and 16 FS (Osnabrück) 43 FSS (Osnabrück) under local command (37 FS UC for local admin. Remained part of 32 Engr Regt)	Lt Cols Apr 1969: B S Read Dec 1970: D T Cholerton Jun 1973: C W Woodburn Dec 1975: E G Willmott	23 Engr regt Di 1958 on BAOR reorganization
	1971		Apr 7 FS TT 32 Engr Regt 37 FS TF 32 Engr Regt			
	1972			Mar-Jul to NI in inf role.		
	1976		Apr 37 FS TT 35 Engr Regt May 43 FSS TT 23 Engr Regt Jul 73 Indep FS moved to Osnabrück, under local command 23 Engr Regt. Nov 73 Indep FS no longer UC.	Sep 23 Engr Regt and 25 Engr Regt AF 2 Armd Div Engr. Regt Sub units: 12,16, 39 FS and 43 FSS		
	1977		Jun to Oct to NI in inf role.			
25 Engineer Regiment	1960	Osnabrück	37 FS 39 FS 50 FS 65 Corps FPS UC		Lt Cols Apr 1958: D G M Fletcher Nov 1960: J G Hanson May 1963: F R Howell	Moved from Maidstone 1958 as 25 Corps Engineer Regiment
	1962		May 23 Amph RC, squadron Fo Under Local Command			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1963		Aug 23 Amph RC Sqn Be 23 AES		Sep 1965: A G C Jones 1968: F W E Fursdon 1970: P H Brazier Jan 1972: J R Alford 1974: G R Owens 1976: E G Willmott	
	1964		May 23 AES Be indep, left regt Nov 65 Corps FPS no longer UC, TT 35 CER Oct 43 FPS UC Aug 50 FS to Aden. TT 36 Engr Regt 1965 Dec 12 FS TF 38 CER			
	1967		Apr-Oct 39 FS to Aden			
	1968		Jan 43 FPS Be 43 FSS Feb 37 FS TT HQRE 2 Div			
	1969		43 FSS TT 23.Engr Regt	Apr. Regt redesignated 25 Engr Regt		
	1973			Jul-Dec to NI in inf role		
	1976			25 Engr Regt and 23 Engr Regt AF 2 Armd Div Engr Regt. Sub units 12, 16, 39 FS 43 FSS		
	1977			Jun-Oct to NI in inf role		
	1980			Oct 1979-Jan 1980 to NI in inf role		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
26 Engineer Regiment	1969	Sennelager	Fo from 5, 25 FS, Sennelager		Lt Cols: 1968: J P Groom 1970: W N J Withall 1972: J R M Hill	1957. 26 Engr Regt Di on BAOR reorganization
	1970	Iserlohn		Nov. Regt moved to Iserlohn	Dec 1974: D H A Swinburn	
	1971		Apr-Jul 5 FS to NI in inf role UC 21 Engr Regt		Jul 1977: W R C Timpson Jan 1978: W I C Dobbie	
	1972		Nov-Mar 1973 25 FS to NI in inf role UC 35 Engr Regt		May 1980: D A Grove	
	1974			Jul-Nov to NI in inf role		
	1976		Jun-Oct 25 FS to NI			
	1977		2 Armd Engr Sqn Be 2 FSS TT 26 Engr Regt 30 FS TF 32 Engr Regt			
	1978			Regt redesignated 3 Armd Div Engr Regt Sub units 5, 25, 30 FS and 2 FSS Jul-Nov to NI in inf role		
28 Amphibious Engineer Regiment	1970	Hameln	23 AES. 64 AES Fo at Hameln Aug	Fo Apr 1970 based on 23 AES	Lt Cols: Aug 1970: H J Goodson	1957. 28 Engr Regt Di on BAOR reorganization
	1971		73 AES Fo at Hameln Jan		Feb 1973: P J Walsh Aug 1975: J J Stibbon	
	1973		Jul-Dec 64 AES to NI in inf role UC 25 Engr Regt		Sep 1977: M E Coe Oct 1979: E H Barker	
	1974		Jun-Nov 73 AES to NI in inf role UC 26 Engr Regt			
	1976		Mar-Jun 73 AES to NI in inf role UC 32 Engr Regt			
	1976	Osnabrück	73 AES Be 73 Indep FS TT 5 Fd Force			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1977		64 AES to NI in inf role Feb-Jun Oct 1978-Feb 1979 23 AES to NI			
	1979		HQ Sqn Fo Mar HQ Sqn Be 71 AES (HQ and Trg) Apr			
	1980		Mar-Jul 64 AES to NI in inf role			
32 Armoured Engineer Regiment	1964	Hohne	2 FS Be 2 Armd Engr Sqn at Münster	Sep 32 Armd Engr Regt Fo at Hohne Sub units 2, 26 Armd Engr Sqn, HQ Sqn	Lt Cols Oct 1964: J H Page Apr 1967: S T Baldry Jun 1969: J S Fowles Dec 1971: P R T Driscoll Jun 1974: A C D Lloyd Oct 1976: M E Coe Oct 1979: W M Crawshaw	1957 32 Assault Engr Regt Di on BAOR reorganization
	1965		2 Armd Engr Sqn moved to Hohne			
	1969		Apr 30 FS (Hameln) UC from 35 CER, 37 FS (Osnabrück) UC from 2 Div Engr. 2, 26 Armd Engr Sqn remained temporarily UC Sep 31 Armd Engr Sqn Fo (Hohne)	Apr Regt redesignated 32 Engr Regt Sub Units changed to 30, 37 FS		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1970		30 FS moved to Hohne 2 Armd Engr Sqn TT HQRE 4 Div Iserlohn			
	1971		Mar 31 Armd Engr Sqn TT HQRE 2 Div Osnabrück Apr 37 FS TT 23 Engr Regt 7 FS TF 23 Engr Regt Moved to Hohne 26 Armd Engr Sqn TT HQ RE 1 Div. Nov-Mar 1972 30 FS to NI in inf role			
	1974			Jan-May Regt to NI in inf role		
	1976			Mar-Jun Regt to NI in inf role		
	1977		7 FS TT 21 Engr Regt 30 FS TT 26 Engr Regt 26 Armd Engr Sqn remained as indep sqn at Munsterlager	Sep Regt Di		
	1980	Verden Munsterlager	RHQ 26 Armd Engr Sqn 31 Armd Engr Sqn Fo	Jan 32 Armd Engr Regt Fo RHQ at Verden. Sub units 26, 31 Armd Engr Sqns and HQ Sqn at Munsterlager		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
33 Engineer Regiment (EOD)	1973	Chattenden	49, 71 EOD Sqns	May. Fo at Chattenden by redesignating EOD unit RE	Lt Cols May 1973: R C Plummer Jan 1974: G J Chave Aug 1976: M Fraser-Allen May 1979: R H Aylmore	HQ Bomb Disposal Unit (UK) Fo 1950. Moved to Chattenden 1966
	1974		71 EOD Sqn Di			
35 Engineer Regiment	1960	Osnabrück	30 42 FS 16 Indep FS 16 Indep FS Be 16 FS	35 Corps Engineer Regiment	Lt Cols May 1959: C W Woods Nov 1960: C H Cowan	
	1964		29 FS (Hameln) TT 35 Engr Regt 65 CFPS UC 16 FS TT HQRE 2 Div	Regt moves to Hameln	May 1963: B J Coombe Nov 1965: H E M L Garrett May 1968: J H G Stevens Jul 1970: M Matthews	
	1966		Sep-Apr 1967 30 FS to Aden		Sep 1972: D C Whitten Mar 1975: F G Bevan	
	1968		Jan 65 CFPS Be 65 CSS		Aug 1977: L F H Busk	
	1969		Apr 29 FS 42 FS 30 FS UC 32 Armd Engr Regt 30 FS TT 32 Armd Engr Regt Hohne.	35 Corps Engineer Regt Be 35 Engr Regt	Jan 1980: P R levers	
	1970		44 FSS, UC HQRE 4 Div Moved to Hameln, under local command 35 Engr Regt			
	1971			Apr-Jul 42 FS to NI in inf role UC 21 Engr Regt		
	1972			Nov-Mar 1973 to NI in inf role		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1974		Nov-Feb 1975 42 FS to NI in Inf role			
	1976		Apr 37 FS UC 35 Engr Regt Oct-Feb 1977 42 FS to NI in inf role			
	1977			Dec 35 Engr Regt Be 4 Armd Div Engr Regt. Sub units 29, 37, 42 FS and 44 FSS		
36 Engineer Regiment	1960	Maidstone		36 Corps Engineer Regt Jan Regt reorganized into two sqns 20, 24 FS	Lt Cols: Feb 1960: A E Younger Jan 1962: G T E Westbrook Jul 1964: S A Frosell Apr 1966: J N Holden Jul 1968: C J Popham Jan 1971: J H Hooper Jul 1973: J B Awford Jan 1976: C W Beckett Jun 1978: A E W Black Oct 1980: G W Field	
	1962		24 FS moved to Hoo, in support RSME. Remained UC			
	1963		Apr 59 FS Fo UC Moved to Shorncliffe, Dec 20 FS to Cl returned Apr 1964			
	1964		Jan 59 FS TT Far East Apr 60 FS Fo Shorncliffe Nov 10 FS (Airfds) Fo for duty in Aden 61 FS reformed as 61 FPS 24, 60 FS to Aden	Jan Regt Redesignated 36 Engr Regt		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1965		Aug 10 FS (Airfds) to Aden. Ceased to be UC 24 60 FS returned Sep 20 FS to Aden Oct 50 FS TF Aden came UC 36 Engr Regt			
	1966		Sep RHQ 61 FPS 24 FS to Bahrain Oct 20 FS returned			
	1967		Feb RHQ 61 FPS returned Jun 24 - FS returned Mar-Oct 60 FS to Aden			
	1968		Jan 61 FPS Be 61 FSS Sep 24 FS TT 12 RSME Regt 50 FS to Cyprus and Gibraltar Oct-Dec 20 FS to British Honduras			
	1970		Sep - Jan 1971 60 FS to NI			
	1971		Feb-Jun 20 FS to NI			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1972		Feb RHQ and 61 FSS AF 61 HQ Sqn Oct-Feb 1973 20 FS to NI Nov-Feb 1973 60 FS to NI Feb-Jun, Aug-Sep 50 FS to NI			
	1974		May-Jun 50 FS to NI Oct-Dec RHQ 20 50 FS and elements of 61 HQ Sqn to NI			
	1976		Oct-Jan 1977 50 FS to Oman			
	1977		Mar 50 FS, 63 HQ Sqn (Airfds) AF 50 FS (Const) Apr 61 HQ Sqn Be 61 FSS 60 FS Be 60 FSS TT 39 Engr Regt Waterbeach			
	1978		9 Para Sqn Aldershot UC Feb-Jun 20 FS to NI			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
37 Engineer Regiment	1967	Longmoor	33 FS TF Cyprus to Regt	37 Engr Regt Fo	Lt Cols: Sep 1967: D J N Genet Mar 1970: R W Dowdall Aug 1972: A Whitehorn	37 Corps Engr Regt ; Di 1959 Cyprus
	1968		Apr UK Command Plant Tps AF 66 Plant Sqn			
	1969		Jan 10 (Gulf) FS returned to UK. Joined Regt as 10 FS Mar-Mar 1970 half 33 FS to Anguilla			
	1970		Oct-Jan 1971 one tp 10 FS to NI Aug-Dec 33 FS to NI			
	1971		Jan-Aug 10 FS emergency tour Gibraltar Jan-Oct 33 FS to NI			
	1972		Apt-Oct 10 FS less a tp in British Honduras Jul-Nov 33 FS to NI			
	1973		Jan 10 FS TT BAOR as RAF support unit Oct-Feb 1974 33 FS to NI			
	1974		Jul 33 FS Be 33 Indep FS TT NI in support of 39 Inf Bde 66 Plant Sqn TT HQ 12 Engr Bde	Aug 37 Engr Regt Di		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
38 Engineer Regiment	1960	Ripon	48 FS 63 FS 15 FPS Jul 17 FS TF Chiseldon to Ripon Dec 17 FS Di 63 FS Be 12 FS	38 Corps Engineer Regiment	Lt Cols: Jul 1958: R L Clutterbuck Jan 1961: D J Willison May 1963 I R R Hollyer Feb 1965: J D Walker Aug 1967: J H Foster Nov 1969: M G L Roberts Jan 1972: A J V Kendall Jun 1974: J S Symons Mar 1977: N H Thompson Sep 1979: N A L Curtis	38 CER Fo 1951 Osnabrück
	1961		Aug 32 Const Sqn TF Fortress Engr Regt, Gibraltar Be 32 FS			
	1963		Oct 12, 48 FS RHQ to Aden. RHQ and 48 FS returned Apr 1964 12 FS returned Oct			
	1964		Jul 73 (Cl) Sqn TF C1 Be 73 FS Dec 12 FS TT 25 CER, BAOR	Jan 38 CER Be 38 Engr Regt		
	1965		Jul 53 FS (Airfds) Fo Aug 51 FS (Airfds) Fo Aug-May 1966 32 FS to Borneo			
	1966		Jan 51 FS (Airfds) TT Singapore May 53 FS (Airfds) TT 39 Engr Regt, Waterbeach			
	1968		15 FPS Be 15 FSS			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1970		Feb 73 FS Be 11 FS Jan-Mar 15 FSS Be 15 (Gulf) SS to Gulf Mar-Sep 48 FS to Anguilla Jun-Jul 11 FS, one tp to NI			
	1971		Jun-Nov 48 FS to NI Oct-Feb 1972 11 FS to NI			
	1972		Jun 15 FSS and RHQ AF 15 HQ Sqn Aug-Feb 1973 11 FS to Honduras/Gibraltar			
	1973		Feb-Jun 48 FS to NI. 15 HQ Sqn, one tp to NI Jun-Oct 11 FS to NI			
	1974		Mar-Jul 48 FS HQ and one tp to Sharjah May-Jul 11 FS to NI			
	1975		Nov-Dec 11 FS to NI			
	1977		11 FS less one tp to Oman. One tp to Belize 15 HQ Sqn Be 15 FSS 51 FS (Const) TF 39 Engr Regt			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1978		Mar-Nov 11 FS to NI Jun-Oct 51 FS (Const) to NI			
39 Engineer Regiment	1966	Waterbeach	52 FS (Airfds), Waterbeach TT HQRE (Airfds) 53 FS (Airfds) TF 38 Engr Regt. Ripon	May HQRE (Airfds) Fo, Sub units 52, 53 FS (Airfds)	Lt Cols May 1966: P G L Mitchley Nov 1967: R W Bird May 1970: N D Clifford Nov 1972: R Jukes-Hughes May 1975: J N S Drake	39 Army Engr Regt Di Feb 1956
	1967	Waterbeach		Mar HQRE (Airfds) Be 39 Engr Regt (Airfds)	Oct 1977: A N Carlier Apr 1980: M J Payne	
	1968		51 FS (Airfds) TF Singapore May-May 1969 53 FS to Virgin Islands			
	1969		Mar 63 (Gulf) Sp Sqn TF Sharjah, Be 63 FSS (Airfds)			
	1970		Nov RHQ and 63 FSS AF 63 HQ Sqn (Airfds) Aug-Feb 1971 52 FS (Airfds) to Anguilla			
	1971		Mar-Sep 51 FS (Airfds) to Anguilla Nov-Mar 1972 53 FS (Airfds) to NI			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1972		63 HQ Sqn (Airfds) det to NI			
	1974		Feb-Jun 52 FS (Airfds) to NI			
	1975		Feb-Jun 51 FS (Airfds) to NI			
	1977	Waterbeach	Feb-Jun 53 FS (Airfds) to NI. Mar 63 HQ Sqn (Airfds) TT 36 Engr Regt. Maidstone AW 50 FS and Be 50 FS (Const) Apr 60 FS TF 36 Engr Regt Be 60 FSS. May 52 FS (Airfds) to NI Jun 48 FS TF 38 Engr Regt Ripon. 51 FS (Airfds) Be 52 FS (Const) TT 38 Engr Regt Aug 53 FS (Airfds) Be 53 FS (Const) Oct 34 FS TF 22 Engr Regt Tidworth 52 FS (Airfds) Be 52 FS (Const) TT 22 Engr Regt	Jun 39 Engr Regt (Airfds) Be 39 Engr Regt. Sub units 34, 48 FS, 53 FS (Const) and 60 FSS		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1978		Aug One Tp 34 FS to Belize Feb-Jun 48 FS to NI			
	1980		Feb-Jun 34 FS to NI			
40 Adv Engr Stores Regt	1960	Willich	21, 80 Wksp and Pk Sqn, 46 FPS, 41 Plant Park Sqn Apr 80 Wksp and Plant Sqn and 46 FPS AF 46 Wksp and Pk Sqn stationed at Geel		Lt Cols Feb 1959: J D Grice Nov 1961: D Kenwrick Cox Sep 1964: T G Glendenning Mar 1967: D G Raschen Jul 1969: J H Joiner Jul 1971: J D Waymark Mar 1973: R A Dennis Sep 1975: R W M Eagle	40 AESR Fo 1952
	1968		Jan 21 Wksp and Pk Sqn Be 21 Pk Sqn 46 Wksp and Pk Sqn moved to Paderborn 21 Pk Sqn Be 21 Army Sp Sqn 41 Plant Pk Sqn Be 41 Army Sp Sqn 46 Wksp and Pk Sqn Be 46 Army Sp Sqn, then Di	Jan 40 AESR Be 40 Army Sp Regt		
	1976		Apr-Aug 21 Army Sp Sqn to NI			
	1977		Oct 21 Army Sp Sqn Be indep TT BAOR in engr sp role	Oct 40 Army Sp Regt Di		

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1978		Jan 41 Army Sp Sqn Di			
41 Engineer Park Regiment	1969	Long Marston	HQ Sqn 31 Wksp Sqn 35 Park Sqn	Jan 41 Engr Park Regiment Fo	Lt Cols Jun 1969: M J W Wright	The Fo of the regt was, in effect, a redesignation of existing units.
	1970		Sqns Di	Dec 41 Engr Park Regiment Di		
42 Survey Engineer	1960	Cyprus	19 Topo 22 Carto Aug 22 Carto and 32 Lith AF 22 Repro Sqn		May 1959: A Walmsley-White Jan 1962: E P J Williams Mar 1964: G A Neale Dec 1965: R S J Ireland Jan 1968: T R Burrows Nov 1970: R M W Busk Sep 1973: G R Gathercole Dec 1975 C N Thompson Aug 1978: P E Andrews Dec 1980: N H Charles	42 Svy Engr Regt Fo Egypt 1948
	1962		22 Repro Sqn Be 22 Litho Sqn			
	1963	Barton Stacey	Jun 19 Topo Sqn remained Cyprus, then to Aden 47 Carto Sqn Fo Nov 19 Topo Sqn TT Barton Stacey	Jun Regt moved to Barton Stacey		
	1967		13 Fd Svy Sqn moved to Barton Stacey UC 42 Regt			
	1968		13 Fd Svy Sqn TT 42 Svy Engr Regt			
	1972		Jun 22 Litho and 47 Carto Sqns AF 22 Map Production Sqn			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1973		Jan 19 Topo Sqn Be 19 Geodetic Sqn			
	1974		22 Map Production Sqn Di			
	1976		Jun 19 Geodetic Sqn Be 19 Topo Sqn 13 Fd Svy Sqn Be 13 Map Production Sqn			
50 Gurkha Field Engineer Regiment	1960	Sungei Besi, Malaya.	67 68 Gu Fd Sqn 74 FPS Apr HQ Sqn Fo 70 Gu FPS Fo	50 Gu Fd Engr Regt Be Gurkha Engineers FARELF	Lt Cols: May 1958: W G F Jackson Apr 1960: L G S Thomas May 1963: M J A Campbell	50 Fd Engr Regt Fo 1952, Hong Kong, be 50 Gurkha Fd Engr Regt 1955
	1961	Kluang, Malaya.	Mar 74 FPS Di Apr 69 Gu FS Fo at Kluang, Cadre strength	Nov. Regt moved to Kluang. Malaya	Nov 1965: T C White Feb 1968: G G Roach Sep 1970: R A S Rickets Mar 1973: J H Edwards Sep 1975: J Speight Mar 1978: M J F Stephens	
	1962		Jan 70 Gu FPS Be 70 Gu Pk Trg Sqn May 68 Gu FS moved to Tidworth UC 3 Div Jul 68 Gu FS Be Indep FS Sep 67, 69 Gu FS Be Indep FS Nov 69 Gu FS brought up to strength, moved to Borneo		Oct 1980: P J Worthington	

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1963		Dec 68 Gu (Indep) FS TF UK to Borneo, UC Regiment			
	1964		Jul 68 Gu (Indep) FS returned to Kluang			
	1966		Jan 69 Gu (Indep) FS moved to H Kong, remained UC. Jun 70 Gu Pk Trg Sqn and HQ Sqn AF 70 Gu Trg Sqn			
	1968		Jan 70 Gu Trg Sqn Be 70 Gu Sp Trg Sqn Aug 68 Gu (Indep) FS moved to H Kong, remained. UC. 69 Gu (Indep) FS Di			
	1970	Hong Kong	May 70 Gu Sp Trg Sqn moved to Singapore Jul 70 Gu Sp Trg Sqn Be 70 Gu Trg Sqn	Mar. Regt, less 70 Gu Sp Trg Sqn moved to H Kong.		
	1971		Jul 70 Gu Trg Sqn Di			
	1977			Regt. Be Queens Gurkha Engineers		

DIVISIONAL ENGINEERS (BAOR) 1960 - 1969

(a)	(b)	(c)	(d)	(e)	(f)	(g)
1 Inf Div Engineers	1960	Verden	4 FS (Fallingbostel) 7 FS (Osnabrück) 45 FPS (Nienburg) 1 FS TT 1 Inf Div from 4 Div, remained at Paderborn	Jul 5 Inf Div Be 1 Inf Div HQRE Verden	CREs Lt Cols: Feb 1958: J R Cave-Browne May 1960: L Scott-Bowden Aug 1962: J I Purser Mar 1965: C P de B Jenkins Oct 1967: C P Campbell	Fo 1957 as 7 Armd Div Engrs. Be 5 Inf Div 1958
	1961		Jan 7 FS TT 2 Div 26 AR Engr Sqn UC 1 Inf Div, Hohne			
	1962	Nienburg	Jan 4 FS moved to Nienburg, remained UC 1 FS moved to Nienburg, remained UC	HQRE 1 Div moved to Nienburg		
	1965		Mar 26 AR Engr Sqn TT 32 Armd Engr Regt			
	1968		Jan 45 FPS Be 45 FSS			
	1969	Nienburg	1 FS 4 FS 45 FSS under local comd	Apr 21 Engr Regt reformed from 1 Div Engrs, Nienburg Sub units 1, 4, FS		
1 Armd Div Engineers	1978	Nienburg	1FS 4FS 7FS 45SS	Regt Be 1 Armd Div Engr Regt		Restructuring plan
	1979		Regt less 1 FS to NI Mar to Jul			
2 Inf Div Engineers	1960	Lübbecke	2 FS (Münster) 25 FS (Minden) 43 FPS (Hameln)	HQ RE 2 Div Lübbecke		Fo 1957 as 2 Div Engrs

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1961		Jan 7 FS TF 1 Div (Osnabrück) Nov 25 FS TT 4 Div 29 FS TF 4 Div (Hameln)			
	1964	Osnabrück	Sep 2 FS Be 2 AR Engr Sqn TT 32 Armd Engr Regt Oct 43 FPS moved to Osnabrück. Remained in Div, but under local command 25 CER 29 FS TT 35 CER (Hameln) 16 FS TF 35 CER (Osnabrück)	Oct HQRE 2 Div moved to Osnabrück	CREs Lt Cols Jan 1959: D Ross Oct 1961: F G Caldwell Nov 1963: S E M Goodall Aug 1965: W G H Beach Oct 1967: E N Ross-Magenty Jun 1969: B S Read	
	1968		Jan 43 FPS Be 43 FSS Feb 7 FS moved to Ripon, remained in Div 37 FS TF 25 CER (Osnabrück)	Oct HQRE 2 Div moved to Osnabrück		
	1969		7 FS (Ripon) 16 FS 37 FS TT 32 Engr Regt 43 FSS under local command	Apr. 23 Engr Regt reformed from 2 Div Engrs Osnabrück Sub units 7, 16 FS		
2 Armd Div Engineers	1978	Osnabrück	12FS 16FS 39FS 43FSS	Regt Be 2 Armd Div Engr Regt		Restructuring plan
	1979		Oct to Feb 80 Regt to NI in inf role			
3 Armd Div Engineers	1978	Soest	5FS 25FS 30FS 2FSS	New Regt Fo as 3 Armd Div Engr Regt		Restructuring plan

(a)	(b)	(c)	(d)	(e)	(f)	(g)
4 Div Engineers	1960	Paderborn	1 FS (Paderborn) 5 FS (Iserlohn) 29 FS (Hameln) 44 FPS (Paderborn) 1 FS TT 1 Div May 5 FS moved to Paderborn	HQRE 4 Div Paderborn	CREs Lt Cols Jun 1958: G C S Montanaro 1960: A J I Poynder 1962: D R Carroll 1964: M E Tickell Nov 1966: G L C Cooper 1968: J P Groom	Fo 1957 as 4 Div Engrs Hereford
	1961		29 FS TT 2 Div 25 FS TF 2 Div, moved to Paderborn			
	1968		Jan 44 FPS Be 44 FSS			
	1969	Sennelager	Apr 5 FS, 25 FS moved to Sennelager 44 FSS moved to Sennelager UC 26 Engr Regt	Apr 26 Engr Regt reformed from 4 Div Engrs Sennelager Sub units 5, 25 FS.		
4 Armd Div Engrs	1978	Hameln	29FS, 37FS, 42FS 44 FSS Jan to Apr Regt in NI	New regt fo as 4 Armd Div Engr Regt		Restructuring plan
INDEPENDENT SQUADRONS						
1 Fortress Sqn	1961	Gibraltar	Remained when Fortress Regt Di			
	1978		Reorganized as 1 Fortress STRE			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
9 Indep Para Sqn	1960	Cove			Majs: 1959: R M Merrell 1960: I T C Wilson Sep 1962: C L B Gillespie Nov 1965: M Matthews 1967: P J Dickison Apr 1969: S L Rooth Apr 1970: J B Awford Apr 1972: W M R Addison 1974: M J Payne 1976: H G R Taggart	
	1961		Jul to Kuwait for Emergency. Sep to Cove			
	1962	Aldershot				
	1963		Jan to Crookham Dec-Apr 1964 Sqn less 2 tps to Cyprus			
	1965		Jan-Jul A tp in Borneo Jan-Aug A second tp in Borneo Mar-Sep HQ and Park Tp in Aden			
	1970		May-Sep in NI			
	1971		Sep-Jan 1972 in NI			
	1973		Mar-Jul in NI			
	1974		Oct-Feb 1975 in NI			
	1976		Oct-Feb 1977 in NI			
	1977	Aldershot	Apr Redesignated 9 Para Sqn UC 36 Engr Regt			
10 Port Sqn	1960	Singapore	1965 Di on fmn of RCT			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
11 Indep Fd Sqn	1960	Butterworth Malaya	UC 28 Bde		Majs: 1960: C P Campbell Nov 1962: H A Stacy-Marks Nov 1964: J H G Stevens 1966: C J Rougier 1968: R F H Cole	
	1962	Malacca Malaya				
	1963		May 1964 Half Sqn in Borneo Half Sqn in Singapore and Kluang, Malaya			
	1965		Dec-May 1966 Op Crown Thailand			
	1967		Aug-Jan 1968 Op Crown Thailand			
	1969	Malacca	Reduced to Cadre	73FS renumbered as 11FS Ripon Feb 1970		
14 Fd Svy Sqn	1960	Mönchen Gladbach			Majs: Aug 1958: G A Neale Jul 1961: G A Hardy Aug 1963: R M Silberrad Aug 1965: M J K Davies Apr 1966: G H Tomlinson Mar 1968: J L Henshaw Jan 1970: D J Stevenson Jan 1972: J Eady Sep 1973: P E Andrews	Fo 1939 as Corps Fd Svy Coy
	1964	Ratingen	Moved to Ratingen AW 3 BAOR Map Depot to form 14 Topo Sqn			
	1979		Nov-Mar 1980 a tp in NI			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
					1975: S E G Fraser May 1976: A E H Matthews Oct 1977: R Wood Apr 1974: J A C Read Oct 1980: A J Hoon	
33 Indep Fd Sqn	1974	Antrim	Jul on disbandment of 37 Regt to NI in support of 39 Inf Bde, and designated Indep FS		Majs: Mar 1974: E H Barker Feb 1976: A E Houlton Oct 1977: J C G Cragg May 1979: D J Martin	
34 Indep Fd Sqn	1960	Kenya	Less 1 Tp in Aden		Majs: 1959: T C White	Became indep FS on leaving
	1961		Jul-Oct to Kuwait for Emergency		1960: F W E Fursdon Oct 1962: M P Bull 1964: H F Everard	37 Army Engr Regt 1958 to sp 24 Bde
	1964		Became an Airportable Unit			
		Tidworth	Oct. Joined HQRE 3 Div			
38 (Berlin) Fd Sqn	1960	Berlin			Majs: 1959: O McC Roome 1961: E N Ross-Magenty 1963: D P Cadoux-Hudson Oct 1965: R M Hutton Jun 1967: M H R Glover Aug 1968: J R Yerburgh Aug 1970: R M R Luxton	Moved to Berlin Oct 1957 from 23 Engr Regt

(a)	(b)	(c)	(d)	(e)	(f)	(g)
					Jul 1972: J C Murcott Jul 1974: M T Whitworth 1976: J A Cooper May 1978: P R Scarlett Jun 1980: R J H Cooke	
54 Indep Fd Sqn	1960	Hong Kong			Majs: 1959: J E Colbeck May 1961: D J N Genet Aug 1963: J G T Polley Jul 1965: H W B Mackintosh Jul 1967: P R T Driscoll Jul 1969: J R E Ward Jul 1971: R G Osborn Apr 1972: J L Barker Apr 1974 M C S Webb	Remained in Hong Kong when 24 Engr Regt returned to UK and redesignated an Indep FS May 1958
	1962		Oct. Absorbed 410 Indep Plant Tp. To form 54 CFPS Dec to Borneo			
	1963	Singapore	Jul to Singapore			
	1964		Jan-Jul 1968 Plant Tp to Thailand (Op Crown)			
	1965		Nov-Oct 1966 Composite Stores Wksp and Plant Fitter Tp to Borneo			
	1967		Redesignated 54 (FARELF) Sp Sqn			
	1968	Singapore	Jan to Thailand (Op Post Crown) Apr to Singapore			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1970		Absorbed FARELF Engr Park			
	1971	Hong Kong	Jun Di Jul Hong Kong Sp Sqn retitled 54 (Hong Kong) Sp Sqn			
	1975		Dec Di			1976. A Junior Leaders Sqn retitled 54 Sqn (see JLRRE)
59 Indep Cdo Sqn	1964	Singapore Thailand	Jan as 59FS TF 36 CER Maidstone to Thailand. Sqn based in Singapore		Majs: 1963: C A Bramwell Aug 1965: M G L Roberts Sep 1967: G W Preston-Jones Sep 1969: J B Grosvenor Jun 1971: G R Owens Jun 1973: G A Hewish 1975: G W Field Jan 1978: R Lean-Vercoe Dec 1980: R MacDonald	Fo as 59 FS 1963
	1965	Singapore	Dec returned to Singapore			
	1966		May to Thailand Oct to Singapore			
	1967			UC 3 Cdo Bde		
	1971		Apr Be 59 Indep Cdo Sqn May to Plymouth Oct Condor Tp moved to Arbroath in sp 45 Cdo Bde			

(a)	(b)	(c)	(d)	(e)	(f)	(g)
	1972		Jul-Nov to NI			
	1974		Mar to Jul to NI less 2 Tp and Condor Tp			
	1976		Feb-Jul to NI			
	1980		Jun-Oct to NI			
84 Svy Sqn	1960	Singapore	Apr 34 Fd Svy Sqn Di to become Svy Estab FARELF retitled 84 Svy Sqn Sep AW 570 Map Repro tp to become 84 Fd Svy Sqn		Majs: R G Atkey Oct 1962: R C Gardiner Hill Jan 1963: J S Coulson 1965: R M W Busk Oct 1967: T W G Farmer Sep 1969: M R Richards Mar 1970: E M Dean	
	1962	N Borneo	To 1963			
	1970		Dec Di			
89 Svy Trg Sqn	1960	Hermitage	Fo as 89 Svy Trg Sqn at School of Military Survey			Di Kenya 1959 as 89 Fd Svy Sqn
	1971		Di			

CHANGES TO RESERVE ARMY ENGINEER UNITS 1960 - 1980

Notes: a. All units are TA unless otherwise shown.
b. Special Abbreviations

AF	Amalgamated to Form	CFPS	Corps Field Park Squadron	FS	Field Squadron
AW	Amalgamated With	Di	Disbanded	FSS	Field Support Squadron
Be	Became	Fo	Formed	TF	Transferred From
CER	Corps Engr Regt	FPS	Field Park Squadron	TT	Transferred To
				UC	Under Command

REGIMENTS

Designation in 1960	Designation in 1961	Changes during 1961-7	Designation in 1967	Changes during 1967-80	Designation in 1980
(a)	*(b)*	*(c)*	*(d)*	*(e)*	*(f)*
Royal Monmouthshire RE (Militia)	R Mon RE (Corps Engr Regt) (100 FS 101 FS)	Allocated the "shadow" regimental number 70 100 (R Mon RE (M)) FS 108 (Welsh) FS 225 (Birmingham) FS	HQ R Mon RE (M) 100 FS (R Mon RE(M)) (Newport) 108 (Welsh) FS (Swansea) 225 (Birmingham) FS		HQ R Mon RE(M) as for 1967
101 Field (Chelsea)	HQ 101 (London) Corps Engr Regt (222 FS 324 FS) (AW HQ 121 Army Engr Regt)	Transferred to 10th (T) Bn The Queens Regiment			
102 Constr (Paisley)	HQ 102 (Renfrew) Corps Engr Regt (276 FS 540 FS)	HQ 71 (Scottish) Engr Regt (V) Fo (Glasgow) (1967) 102 (Clyde) FS (Paisley) 104 (City of Edinburgh) FS (Edinburgh) 124 (Lowland) FS (Coatbridge) + 117 Fd Pk Sqn UC (Dundee)	102 (Clyde) FS(V)		102 (Clyde) FS(V) (71 Engr Regt)

(a)	(b)	(c)	(d)	(e)	(f)
103 Field (Newcastle)	HQ 50 (Northumbrian) Div/ Dist RE (232 FS 506 FS 235 FPS)	HQ 72 (Tyne Elec Engrs) Regt (V) Fo (Gateshead) (1967) 103 (1st Newcastle) FS (Newcastle) 118 (Tees) FS (West Hartlepool) 129 (East Riding) FS (Hull) +105 (Durham) Plant Sqn UC (South Shields)	103 (Newcastle) FS(V)		103 (Newcastle) FS(V) (72 Engr Regt)
105 Corps Engr (Gateshead)	HQ 105 (Tyne Elec Engrs) Corps Engr Regt (233 FS 234 FS 334 FS)	Absorbed by 72 (Tyne Electrical Engineers) Regiment (V)	105 (Durham) Plant Sqn	Be 105 (Tyne Electrical Engrs) Plant Sqn RE(V) 2 Nov 73	105 (Tyne Electrical Engrs) Plant Sqn(V) (29 Engr Bde)
106 Field (Sheffield)	HQ 49 (West Riding & North Midland) Div/Dist RE (228 FS 350 FS 231 FPS)	HQ 75 Engr Regt (V) FO 106 (West Riding) FS(Sheffield) 107 (Lancashire and Cheshire) FS + 125 (Staffordshire) FPS UC (Stoke on Trent) +143 Plant Squadron (Walsall) UC (Walsall)	106 (West Riding) FS (75 Engr Regt)	TT 72 Engr Regt	106 (West Riding) FS (V) (72 Engr Regt)
107 Field (St Helens)	HQ 107 (West Lancashire) Corps Engr Regt (252 FS 509 FS)	Absorbed by 75 Engr Regt (V)	107 (Lancashire and Cheshire) FS (75 Engr Regt)		107 (Lancashire and Cheshire) FS(V) (75 Engr Regt)
108 Field (Swansea)	HQ 53 (Welsh) Div/Dist RE (244 FS 246 FS 285 FPS)	Absorbed by R Mon RE (M)	108 (Welsh) FS (R Mon RE (M))		108 (Welsh) FS(M) (R Mon RE)
109 Constr (Cardiff)	Amalgamated with 244 FS and 246 FS (see 108 Field)				

(a)	(b)	(c)	(d)	(e)	(f)
110 Field (Bath)	HQ 43 (Wessex) Div/Dist RE (204 FS 205 FS 224 FPS)	Absorbed by R Mon RE (M) (70 Engr Regt)			
111 Plant (AER)	111 Corps Engr Regt (AER) (227 FS 512 FS 513 FS) Formed by amalgamating 120 126 130 139 201 251 Army Engr Regts and 111 Plant Regt RE		HQ 111 Engr Regt (AER) (120 FS 130 FS)		111 Engr Regt (V)
113 Army (Birkenhead)	Became 113 (Cheshire) Indep FS	Absorbed by 75 Engr Regt (V)			
114 Field (Bethnal Green)	HQ 114 (1 London) Corps Engr Regt (216 FS 217 FS)	Transferred to London Yeomanry		217 (London) FS RE(V) reformed 1 Jan 1969	217 (London) FS(V) (73 Engr Regt)
115 Constr (Fareham)	HQ 115 (Hants Fortress) Corps Engr Regt (577 FS 578 FS)	Transferred to Hampshire and IoW Territorials			
116 Army (AER)	Reverted to TA as HQ 116 (Devon and Cornwall) Engr Regt (409 FS 571 FS)	Transferred to Devonshire Territorials (Royal Devon Yeomanry/The 1st Rifle Volunteers)			
117 Field (Aberdeen)	HQ 51 (Highland) Div/Dist RE (236 FS 278 FS 239 FPS) 117 (Highland) Corps Engr Regt (237 FS 277 FS)	236 237 277 278 FS 239 FPS Absorbed by 117 (Highland) FPS	117 (Highland) FPS		117 (Highland) FSS(V) (29 Engr Bde)

(a)	(b)	(c)	(d)	(e)	(f)
118 Constr (Middlesborough)	HQ 118 (Tees) Corps Engr Regt (333 FS 508 FS)	Absorbed by 72 Engr Regt (V)	118 (Tees) FS		118 (Tees) FS (V) (72 Engr Regt)
119 Field (Brighton)	HQ 44 (Home Counties) Div/ Dist RE (211 FS 490 FS 209 FPS)	HQ 44 Div/Dist 211 FS 490 FS Transferred to 9th (T) Bn The Queens Regiment 209 FPS Transferred to 6th (T) Bn The Queens Regiment			
120 Constr (AER)	AF 111 CER				
121 Army (Chelsea)	AW 101 Corps Engr Regt				
122 Field (Cambridge)	HQ 54 (East Anglia) Div/ Dist RE (248 FS 313 FS 251 FPS)	Absorbed by 590 ST(BD) (V)			
123 Field (Manchester)	HQ 42 (Lancashire and Cheshire) Div/Dist RE (200 FS 201 FS 202 FS 203 FPS)	Absorbed by 75 Engr Regt			
124 Field (Motherwell)	HQ 52 (Lowland) Div/Dist RE (240 FS 241 FS 242 FPS)	Absorbed by 71 Engr Regt	124 (Lowland) FS		124 (Lowland) FS(V) (71 Engr Regt)
125 Army (Cannock)	HQ 125 (Staffordshire) Engr Regt (213 FS 214 FS)	Absorbed by 125 (Staffordshire) FPS	125 (Staffordshire) FPS		125 (Staffordshire) FSS(V) (30 Engr Bde)
126 Army (AER)	AF 111 CER				

(a)	(b)	(c)	(d)	(e)	(f)
127 Constr (Smethwick)	HQ 48 Div/Dist RE 225 FS 267 FS 212 FPS)	Absorbed by R Mon RE (70 Engr Regt)			
128 Engr Wksp (AER)					
129 Field (Leeds)	HQ 129 Corps Engr Regt (272 FS 542 FS)	Absorbed by 72 Engr Regt	129 (East Riding) FS (72 Engr Regt)	Jan 1969 RHQ 73 Engr Regt (V) formed 129 (East Riding) FS (from 1977) 217 (London) FS (Holloway) 575 (Sherwood Foresters) FS (Chesterfield) 873 Mov Lt Sqn RE (from 1975) 272 (West Riding Artillery) (Bradford) until 1977 (to 74 Regt)	129 (East Riding) FS(V) (73 Engr Regt)
130 Constr (AER)	AF 111 CER				
131 Para Engr (London)	HQ 131 Para Engr Regt (301 Para FS 302 Para FS)	Redesignated 131 Indep Para Sqn (London)	131 Indep Para Sqn (HQ at London) Troops at Birmingham, Glasgow, Hull	1977 Became 131 Indep Cdo Sqn RE(V). Troops as 1967, Sp Tp Plymouth	131 Indep Cdo Sqn RE(V) (30 Engr Bde)
132 Field (Sunderland)	AW 355 FS and 233 (N) FS To Form 233 FS (105 CER)				
134 Constr (Woodford Green)	313 (Essex) FS (54 Div/Dist RE)	Absorbed by 590 ST (BD) (V)			

(a)	(b)	(c)	(d)	(e)	(f)
135 Survey Engr (London)	HQ 135 Svy Engr Regt (337 Topo Sqn 339 Litho Sqn)	Redesignated 135 Fd Svy Sqn	135 Fd Svy Sqn (Ewell)		135 Fd Svy Sqn (V)
137 BD (AER)		Absorbed by 590 ST (BD) (V)			
139 Army Engr	AF 111 CER				
140 Army	HQ 140 Corps Engr Regt 438 (Derbyshire Artillery) FS 575 (Sherwood Foresters) FS Formed by Redesignation of 438 LAA Regt RA and 575 LAA Regt RA	Transferred to Notts and Derbyshire Regt (T)		575 (Sherwood Foresters) FS RE(V) Formed 1 Jan 1969, (73 Engr Regt (V))	575 (Sherwood Foresters) FS (V) (73 Engr Regt)
142 BD (AER)		Absorbed by 590 ST (BD) (V)			
143 Plant (Walsall)	AW 291 Plant Pk Sqn to become 291 Plant Sqn		Redesignated 143 Plant Sqn RE (HQ 30 Engr Bde) 1 (Midlands) 2 (Lancs) 3 (Welsh) Plant Troops)		143 Plant Sqn (V) (30 Engr Bde)
				1969 202 Duke of Lancasters Own Yeomanry FS formed Became 202 FS RE	202 FS (V) (75 Engr Regt)

(a)	(b)	(c)	(d)	(e)	(f)
144 BD (AER)		Absorbed by 590 ST (BD) (V)			
146 Fd Engr	HQ 146 (Antrim) Corps Engr Regt (255 FS 256 FS 259 FS)	Redesignated HQ 74 (Antrim Artillery) Engr Regt (112 FS 114 FS) Absorbed 260 Corps FPS	HQ 74 (Antrim Artillery) Engr Regt (V) Belfast 112 (Antrim Fortress) FS (Belfast) 114 (Antrim Artillery) FS (Belfast)	272 Fd Sp Sqn From 73 Engr Regt 1977 Remained in Bradford	74 Engr Regt (V) (112FS 114FS 272 FSS)
201 Army (AER)	AF 111 CER				
251 Constr (AER)	AF 111 CER				

ENGINEER GROUP/BRIGADE HQ

(a)	(b)	(c)	(d)	(e)	(f)
22 Gateshead	HQ 22 Engr Gp (North Midland Region) (Nottingham)	Di			
23 Hereford	HQ 23 Engr Gp (Midland Region) (Hereford)	Absorbed by HQ 30 Engr Bde	) HQ 30 Engr Bde) (Stafford)) (74 Engr Regt 75 Engr	73 Engr Regt UC From 1977 74 Engr Regt UC	30 Engr Bde
24 Liverpool	HQ 24 Engr Gp (North Western	Absorbed by HQ 30 Engr Bde	) Regt) (R Mon RE (M))	29 Bde 1977	
25 Colchester (AER)		Di			
26 Salisbury	HQ 26 Engr Gp (South Western Region) (Salisbury)	Di			
27 Chelsea	HQ 27 Engr Gp (Eastern Command) (London)	Di			
2 Port Task Force (Durham)	Redesignated HQ 28 Engr Gp (Northern Region)	Absorbed by 72 Engr Regt (V)			
4 Port Task Force (Glasgow)	Redesignated HQ 29 Engr Gp (Scottish Region)	HQ formed from HQ 155 (Lowland) Inf Bde	HQ 29 Engr Bde (Edinburgh) 71 Engr Regt 72 Engr Regt	Moved to Newcastle 1968 73 Engr Regt UC from 1969 to 1977 74 Engr Regt UC from 1977	29 Engr Bde

INDEPENDENT SQUADRONS

(a)	(b)	(c)	(d)	(e)	(f)
115 Fd Pk	115 CFPS (North Midland Region)	Transferred to The Royal Leicester Regt (T)			
128 Fd Pk	128 CFPS (Northern Region) UC 105 Regt from 1957)		AW 334 FS to become 105 (Durham) Plant Sqn (29 Engr Bde)		
130 Fd Pk	130 CFPS (Eastern Command)	Transferred to London Yeomanry Territorials			
226 Fd	226 (South Midland) FS (Southern Region) (UC 43 Div)	Absorbed by R Mon RE(M) (70 Engr Regt)			
238 Fd Pk	238 CFPS (Scottish Region)	Absorbed by 71 Engr Regt			
241 Fd (Lanark)	241 FS (52 Div/Dist RE)	Absorbed by 71 Engr Regt			
247 Fd Pk	247 (Glamorgan) CFPS (Wales Region)	Absorbed by R Mon RE (M) (70 Engr Regt)			
249 Fd (Luton)	AW 248 and 249 FS To Form 248 FS (54 Div/Dist RE)	Absorbed by 590 ST (BD) (V)			
250 Fd	250 FS (North Midland Region)	Redesignated The Northampton Regt (V)			
253 Crane Op	253 Crane Op Sqn (North Western Region)	Transferred to RCT 15 Jul 1965			

(a)	(b)	(c)	(d)	(e)	(f)
260 Fd Pk	260 CFPS (Northern Ireland Command)	Absorbed by 74 Engr Regt			
266 Wksp and Pk (Oxford)	AW 226 FS (43 Div)	Absorbed by R Mon RE (M) (70 Engr Regt)			
299 Para Fd	299 Para Fd Sqn (East and West Riding Region)	Absorbed by 131 Indep Para Sqn			
300 Para Fd	300 Para Fd Sqn (Scottish Region)	Absorbed by 131 Indep Para Sqn			
307 Fd Pk	307 CFPS (Northern Region)	Absorbed by 72 Engr Regt			
329 Port Op (Glasgow)	329 Port Sqn (HQ 80 (S) Port Regt)	Transferred to RCT			
331 Crane Op (Maryhill)	331 Port Sqn (HQ 80 (S) Port Regt)	Transferred to RCT			

(a)	(b)	(c)	(d)	(e)	(f)
336 Crane Op	336 Crane Op Sqn	Transferred to RCT			
338 Carto	338 Carto Sqn (Southern Region)	Absorbed by 135 Fd Svy Sqn			
422 Fd Pk	422 CFPS (East and West Riding Region)	Absorbed by 72 Engr Regt			
	432 LAA Regt RA Redesignated HQ 432 (City of Edinburgh) Engr Regt (585 FS 586 FS)	Absorbed by 71 Engr Regt			
576 Fd Pk	576 (Hants) CFPS (Southern Region)	Transferred to Hampshire and IoW Territorials			
579 BD	AW 583 BD Sqn to form 590 BD Sqn (Eastern Comd)	590 ST (BD) (V) (Rochester)	590 STRE (BD) (Rochester)		
	580 CFPS (North Western Region)	Absorbed by 75 Engr Regt (V)			
583 BD	AW 579 BD Sqn to form 590 BD Sqn (see above)				
584 Fd (Ipswich)	AW 251 FPS To Form 251 FPS (54 Div/Dist RE)	Absorbed by 590 ST (BD) (V)			

(a)	(b)	(c)	(d)	(e)	(f)
585 Fd (Edinburgh)	AW 432 LAA Regt RA To Form 585 FS UC 432 Corps Engr Regt	Absorbed by 71 Engr Regt			
591 Fd (Belfast)	591 (Antrim) Indep Fd Sqn	Absorbed by 74 Engr Regt		Reformed as EOD Sqn 1972	591 EOD Sqn (V)
624 Crane Op (Wallasey) (AER)	624 (1st Chesh and Caern) Vols (Crane Op Sqn)	Transferred to RCT			
751 Quarrying (AER)					
	863 (County of Lincoln) Mov Lt Sqn (North Midland Region) (Redesignation of 863 Mov Lt By RA)	Transferred to The Royal Lincolnshire Regt (T)			
	873 Mov Lt Sqn (Redesignation of 873 Mov Lt Bty RA	873 Mov Lt Sqn	873 Mov Lt Sqn T&AVR	873 Mov Lt Sqn UC 73 Engr Regt (V)	873 Mov Lt Sqn (V)

OTHER UNITS

(a)	(b)	(c)	(d)	(e)	(f)
Engr and Railway Staff Corps	Engr and Rly Staff Corps	Engr and Rly Staff Corps	Engr and Rly Staff Corps	Engr and Rly Staff Corps T&AVR	
Specialist Pools		Works Staff Pool Geologists Pool Resources Staff Pool Survey Pool	)) Engineer Specialists) Pool)		
AER units		All AER STsRE, CsRE Works and BD units were amalgamated in 1967 to form:	501 Specialist Team RE (Bulk Petroleum) (V) 502 Specialist Team RE (Well Drilling)(V) 503 Specialist Team RE (Bulk Petroleum) (V) 504 Specialist Team RE (Power Station) (V) 505 Specialist Team RE (Engineer Procurement) (V) 506 Specialist Team RE (Public Utilities) (V) 590 Specialist Team RE (Bomb Disposal) (V) (Rochester) 525 Specialist Team RE (Construction) (V) T&AVR 526 Specialist Team RE (Construction) (V)		

Note: All AER Rly and Port units not listed above transferred to RCT or disbanded in 1965

ABBREVIATIONS

AAC	Army Air Corps
ABCA	America Britain Canada Australia
ACB	Airfield Construction Branch
ADM	Atomic Demolition Munition
ADR	Airfield Damage Repair
AER	Army Emergency Reserve
AMF (L)	Allied Command Europe Mobile Force (Land)
AMWD	Air Ministry Works Department
ANZUK	Australia New Zealand and United Kingdom
APC	Armoured Personnel Carrier
A/Q	Adjutant-General/Quarter-Master-General Staff
ARK	Armoured Ramp Carrier
ASD	Army Staff Duties
ASLS	Air Survey Liaison Section
AVLB	Armoured Vehicle Launched Bridge
AVRE	Armoured Vehicle Royal Engineers
AWO	Army Works Organization
BAOR	British Army of the Rhine
BATT	British Army Training Team
BATUS	British Army Training Unit Suffield
BD	Bomb Disposal
BECD	Base Economic Conversion Department
BFPO	British Forces Post Office
BG	Battle Group
BRIXMIS	British Commanders-in-Chief Mission
BRLSC	British Logistic Support Command
BR80, 90	Bridging for the 80s, 90s.
CBR	California Bearing Ratio
CENTO	Central Treaty Organization
CINCFE	Commander-in-Chief Far East
CO	Commanding Officer
COMBRITBOR	Commander British Forces in Borneo
CPX	Command Post Exercise
CRE	Commander Royal Engineers
CVHQ	Central Volunteer Headquarters
DADPCC	Deputy Assistant Director Postal and Courier Communications
DCRE	Deputy Commander Royal Engineers
DEL	Directly Employed Labour
DEODS	Defence Explosive Ordnance Disposal School
DES	Director Engineer Services
DFVE	Director Fighting Vehicles and Engineer Equipment
DMO	Director Military Operations
DMS	Directly Moulded Sole
DOE	Department of the Environment

DREE	Director Royal Engineer Equipment
DVT&C	Director Volunteers Territorial and Cadets
EBI	Engineer Base Installation
EBW	Engineer Base Workshops
E-in-C	Engineer-in-Chief
E & M	Electrical and Mechanical
ENSA	Entertainments National Service Association
EOD	Explosive Ordnance Disposal
ESBD	Engineer Stores Base Depot
ESG	Engineer Stores Group
ESSE	Engineer Special Services Establishment
ETC	Engineer Training Centre
EWBB	Extra Widened Bailey Bridge
FARELF	Far East Land Forces
FCO	Foreign and Commonwealth Office
FCS	Forces Courier Service
FCT	Final Concept Team
FE	Far East or Field Engineer
FEAF	Far East Air Force
FINABEL	France Italy Norway Allemagne Belgium England Luxembourg
FLDA	Federal Land Development Authority
FLOSY	Front for the Liberation of South Yemen
FPO	Forces Post Office
FVRDE	Fighting Vehicles Research and Development Establishment
FXHQ	Forward Exercise Headquarters
GDP	General Deployment Plan
GE	Garrison Engineer or Gurkha Engineers
GHQ	General Headquarters
GPMG	General Purpose Machine Gun
GOC	General Officer Commanding
GSO2	General Staff Officer Grade 2
HAFB, HFB	Heavy Assault Floating Bridge, Heavy Floating Bridge
HGB	Heavy Girder Bridge
HK	Hong Kong
HQRE	Headquarters Royal Engineers
ICST	International Concept Study Team
IED	Improvised Explosive Device
II	Image Intensification
ILS	Instrument Landing Systems
IRA	Irish Republican Army
JARIC	Joint Air Reconnaissance Intelligence Centre
JO	Junior Officer
JSBDS	Joint Services Bomb Disposal School
kVA	Kilo Volt Amp
LAFB, LFB	Light Assault Floating Bridge, Light Floating Bridge

LCM	Landing Craft Medium
LE(A)	Logistic Executive (Army)
LSL	Landing Ship Logistic
LST	Landing Ship Tank
LWT	Light Wheeled Tractor
LZ	Landing Zone
MACC	Military Aid to the Civil Community
MBFR	Mutual Balanced Force Reduction
MCAG	Mobile Civilian Artisan Group
MCG	Mobile Civilian Group
MCPG	Mobile Civilian Plant Group
MELF	Middle East Land Forces
MEXE	Military Engineering Experimental Establishment
MGB	Medium Girder Bridge
MGO	Master General of the Ordnance
MLC	Military Load Class
MOD	Ministry of Defence
MPBW	Ministry of Public Buildings and Works
MRT	Medium Range Transport
MSR	Main Supply Route
MT	Motor Transport
MVEE	Military Vehicles and Engineering Establishment
MWF	Military Works Force
MWT	Medium Wheeled Tractor
NAAFI	Navy Army and Air Force Institutes
NATO	North Atlantic Treaty Organization
NBC	Nuclear Biological and Chemical
NCO	Non Commissioned Officer
NE	Near East
NEARELF	Near East Land Forces
NLF	National Liberation Front
NORTHAG	Northern Army Group
NZ	New Zealand
OCLF	Overseas Commonwealth Land Forces
OCRE	Officer Commanding Royal Engineers
OCS	Officer Cadet School
Ops	Operations
PAGEOS	Passive Geodetic Satellite
PCCU	Postal and Courier Communications Unit
PCU	Postal and Courier Unit
PDRY	Peoples Democratic Republic of Yemen
PFLOAG	Peoples Front for the Liberation of the Arabian Gulf
PIRA	Provisional Irish Republican Army
POW	Prisoner of War
PQC	Pavement Quality Concrete
PQE	Professionally Qualified Engineer

PSA	Property Services Agency
PSI	Permanent Staff Instructor
PSP	Pierced Steel Plank
PTA	Practical Training Area
PVR	Premature Voluntary Release
PWD	Public Works Department
RAC	Royal Armoured Corps
RAE	Royal Aircraft Establishment or Royal Australian Engineers
RAF(G)	Royal Air Force (Germany)
RAMC	Royal Army Medical Corps
RAOC	Royal Army Ordnance Corps
RARDE	Royal Armament Research and Development Establishment
RCT	Royal Corps of Transport
RDD	Rapid Demolition Device
REA	Royal Engineers Association
REBF	Royal Engineers Benevolent Fund
REME	Royal Electrical and Mechanical Engineers
REMRO	Royal Engineers Manning and Record Office
REPCS	Royal Engineers Postal and Courier Services
REYC	Royal Engineers Yacht Club
RHAG	Rotary Hydraulic Arrester Gear
RHQ	Regimental Headquarters
RMAS	Royal Military Academy Sandhurst
RMP	Royal Military Police
RN	Royal Navy
RNZE	Royal New Zealand Engineers
RORC	Royal Ocean Racing Club
RPL	Ramp Powered Lighter
RSM	Regimental Sergeant Major
RSME	Royal School of Military Engineering
RUC	Royal Ulster Constabulary
SACEUR	Supreme Allied Commander Europe
SALT	Strategic Arms Limitation Treaty
SANG	Saudi Arabia National Guard
SAS	Special Air Service
SAVR	Special Army Volunteer Reserve
SBA	Sovereign Base Area
SEATO	South East Asia Treaty Organization
SECOR	Sequential Collation of Range
SFE	Sultan's Force Engineers
SHAPE	Supreme Headquarters Allied Powers Europe
SLAT	Special Logistic Aid to Thailand
SLR	Self Loading Rifle
SME	School of Military Engineering

SMG	Sterling Machine Gun
SNCO	Senior Non Commissioned Officer
SO2	Staff Officer Grade 2
STANAG	Standardization Agreement
STRE	Specialist Team Royal Engineers
TA	Territorial Army
TACIPRINT	Tactical Information Printing System
TAVR	Territorial Army and Volunteer Reserve
TICRE	Technical Information Centre Royal Engineers
TOS	Trucial Oman Scouts
TRANET	Tracking Network
TSDC	Trucial States Development Council
TWOATAF	2nd Allied Tactical Air Force
UAE	United Arab Emirates
UDA	Ulster Defence Association
UKLF	United Kingdom Land Forces
UKMF	United Kingdom Mobile Force
UN	United Nations
UNFICYP	United Nations Force in Cyprus
UNICEF	United Nations Children's Fund
USSR	Union of Soviet Socialist Republics
UVF	Ulster Volunteer Force
UXB	Unexploded Bomb
VHF	Very High Frequency
VTOL	Vertical Takeoff and Landing
WO2	Warrant Officer 2nd Class
ZANU	Zimbabwe African National Union
ZAPU	Zimbabwe African Peoples Union
1 (BR) Corps	1st British Corps
2IC	Second in Command

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For clarity the index has been divided into sections as follows:

1. **GENERAL**

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   b. Other named individuals.

3. **FORMATIONS**

4. **ENGINEER UNITS**

   a. Regiments including C's RE.

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